THE ROLE OF ZOOS IN EDUCATING VISITORS ABOUT CONSERVATION OF WILDLIFE AND HABITATS:
A DESIGN FOR SUNSET ZOO IN MANHATTAN, KANSAS

by

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A REPORT

submitted in partial fulfillment of the requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture and Regional & Community Planning
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Abstract

In the last 30 years there has been a shift toward educating people about conservation within zoos. Public learning about conservation of wildlife and habitats is vital if the extinction of wildlife is to be avoided. Zoos offer opportunities to educate visitors about habitat conservation through programs and activities, and the way individual habitats and zoos are being designed. Education about wildlife and habitat conservation is important, and must address scientific, aesthetic, and ecological values to be effective.

When educating people about the importance of conservation of species and their habitats in zoos, it is important to create a connection between them and nature. This connection can be achieved by creating a sense of place that allows people to be inspired by nature and understand the importance of preserving it for the future. These connections have the potential to change attitudes towards nature and help people imagine wildlife and humans existing in harmony with each other.

This report focuses on the redesign of the tiger and sloth bear exhibits at Sunset Zoo in Manhattan, Kansas, which offer opportunities to create exhibits that focus on animal welfare, offer educational experiences, and evoke a sense of place.

In studying the role that zoos have in educating and encouraging wildlife and habitat conservation, and in creating a sense of place for the broader community, a variety of methods have been used including: literature review, precedent studies, and passive observation of zoo users. Using these methods, I determined that a successful educational programming strategy and design should include: having keepers or volunteers available to talk directly to zoo visitors, creating opportunities for visitors to form an emotional and intellectual connection to the animals and their habitats, creating an immersive experience for visitors within a naturalized exhibit, offering enrichment features for animals that encourage activity and natural behaviors that visitors can observe, and including interactive educational components for visitors. These programming elements can contribute to Sunset Zoo implementing successful strategies for education within exhibits.

THE ROLE OF ZOOS IN EDUCATING VISITORS ABOUT CONSERVATION OF WILDLIFE AND HABITATS:

a Design for Sunset Zoo in Manhattan, Kansas

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01
project introduction

Sunset Zoo Redesign

The Sunset Zoo in Manhattan, KS is redesigning their tiger and sloth bear habitats. The current tiger and sloth bear exhibits are located on a site with severe slopes and are a part of the Asia Trail. There is currently no tiger inhabiting the exhibit, but a new one will be acquired with the completed construction of the new habitat.

In studying zoos and the role they play in conservation education, I worked with the Sunset Zoo on a habitat design for tigers and sloth bears that utilizes my findings. According to World Association of Zoos and Aquariums, the continued development of zoos and their exhibits must focus upon conservation and management of animals and revealing how animals exist in their natural environments (2005).

Design Challenge

The main challenges with a redesign of the tiger and sloth bear exhibits are finding ways to provide educational programming about the conservation of species and their habitats while also serving the animal's needs. The exhibits are located on a severe slope which affects visitor access and the potential location of a visitor viewing area.

The first consideration when designing any animal exhibit is the animal's needs. The second consideration is how visitors are experiencing the exhibit. To create a unique and immersive experience for viewers it will be essential to create a space that allows them to form an emotional and physical connections to the animals and their habitats. This connection will encourage visitors to learn and understand the importance and best practices of conservation.

Opportunities

Redesign of the tiger and sloth bear habitats offers an opportunity to create a new exhibit that not only focuses on the welfare of the animals living in the spaces, but also the chance to create for visitors a unique and educational experience. A new design could increase interest for visitors and educate them about conservation of the species and their habitats.

There is also the opportunity to design an exhibit that will evoke a sense of place, that of the animal's habitat layered with local place. To create a sense of place, architectural features and native plantings could be integrated into viewing areas to allow visitors to form a closer connection to the native environments of the animals they encounter. It is important to encourage and create moments of connection to the animals and their habitats. These connections have the potential to change attitudes towards nature and help people imagine wildlife and humans existing in harmony with each other.

Another opportunity is the exhibits' ability to contribute to Sunset Zoo as a place. It will be important to utilize plant materials that are both reflective of the animals' natural habitats and native to the Flint Hill region.

02
background

History of Zoos

Many zoos have the goal of educating and informing visitors about the importance of conservation and the supporting roles people can play in wildlife conservation. Humans are connected to wildlife and have lasting impacts on their habitats particularly in regards to hunting and habitat degradation. According to the World Association of Zoos and Aquariums, "zoos and aquariums with their unique resource of live animals, their expertise, and their links to field conservation will be recognized as leaders and mentors in formal and informal education for conservation" (Olney 2005, 35).

Wildlife conservation is important to people due to scientific, aesthetic, and ecological values. Intrinsic values (the worth of animals and habitats in and of themselves) are also important. In the past several decades, zoos have become more interested in conservation since the many species within them are becoming increasingly rare in their natural environments. "Zoos all over [the United States] are making a difference for wildlife and wild places by sharing their passion for conservation with more than 143 million visitors a year" (Falk et al. 2007, 5). Zoos offer opportunities to educate visitors on animal welfare and biodiversity. Not only do emotions assist in creating memorable experiences, they also affect how people think about wildlife. It is thus very important to understand how zoo habitats can be designed to evoke different human emotions and what effects those emotions can have. Since zoos are places where many people go to be excited and experience something they would not normally experience, it is imperative to create habitats that stimulate animals and visitors alike. These experiences relate back to how people's emotions are affected by what they are viewing, and how those in turn affect their attitude towards conservation of wildlife and their habitats.

The first thing to consider when seeking to understand the roles of zoos in wildlife

conservation is their history. Throughout the years, zoos have changed and evolved in many ways. Humans have always had a complex relationship with nature and other living creatures, and zoos are no exception (Robinson 1995). Once larger cities developed, zoos were built in many countries to offer people the chance to interact with animals and experience nature in ways they never had before. When zoos and other "bio-institutions" were first being created, they were not focused on education or conservation, but were a symbol of domination over other living creatures (Robinson 1995, 4). Through time, zoos have had multiple roles including: collecting animals, showing animals, education, entertainment, conservation, and research (Packer and Ballantyne 2010). "Originally zoos lacked education, research, and conservation" (Robinson 4). Then people began to look at the broader picture and encourage changes that would impact both animals and visitors in positive ways. The "Hagenbeck revolution" pushed animal exhibits further than just the cages the animals were living in, and brought about new ways of breeding and reproduction in captive animals (Robinson, 10). The Hagenbeck revolution was focused on the happiness and freedom of the animals. It moved away from the original concept of zoo exhibition and attempted to make it appear as though different species of animals were living together (Kisling 2000). After World War II, even more changes occurred in zoos. For the first time, many zoos realized the importance of direct visitor education and using the zoo environment as a learning opportunity, so they hired educational staff (Robinson 10). Since then, "education has become such a major part of the zoo's function that education programs are an essential requirement of international standards for zoo management" (Robinson, 10).

Placemaking

When educating people about the importance of conservation of animals and their habitats in zoos, it is important to create a connection between them and nature. This connection can be achieved by creating a sense of place that allows people to be inspired by nature and understand the importance of preserving it for the future. To create a sense of place the types of plants within the natural habitats of the animals will be imitated as closely as possible while using plants that are native to the Flint Hills. The use of plant materials can evoke a sense of habitat place and local place for visitors. It is important to encourage and create moments of connection to the animals and their habitats. These connections have the potential to change attitudes towards nature and help people imagine wildlife and humans existing in harmony with each other.

According to Artscape, creative placemaking "intentionally leverages the power of the arts, culture and creativity to serve a community's interest while driving a broader agenda for change, growth and transformation in a way that also builds character and quality of place" (Artscape). Zoos are multi-purpose institutions, and art could be integrated with exhibits for both aesthetic and educational purposes. Animal art could offer visitors the chance to touch animals that are otherwise off limits, challenge visitors with environmental messages, and help visitors later evoke memories that are linked to conservation messages. Sunset Zoo already has a strong sense of place that connects visitors with the physical environment of the Flint Hills through the use of native stone that reflects the character of the region. This sense of place creates a unique environment and experience for those visiting the zoo.

Zoos + Visitors

One of the first things that needs to be examined when researching the impact of zoos on visitor education is the types of people visiting zoos. According to Falk (2006, 3-4), there are five types of visitors:

1. The explorer: curiosity-driven and seek to learn more about whatever they might encounter at an institution.

2. The facilitator: focused primarily on enabling the experience and learning of others in their social group.

3. The professional / hobbyist: feel a close tie between the institution's content and their professional or hobbyist passions.

4. The experience seeker: primarily derive satisfaction from the fact of visiting this important site.

5. The spiritual pilgrim: primarily seeking a contemplative experience.

It is vital to understand what messages zoos are trying to convey to visitors. "Zoos have passed from possessing a few deliberate messages, themselves directed at a minority audience, to institutions that are ostensibly specialized for communicating important messages to a mass audience" (Robinson 1995, 11). According to Hutchins, for programs that focus on conservation and management of animals, it is important to keep in mind how animals relate to their natural environments (2003, 14). "The ultimate purpose of all zoo- and aquarium-based conservation should not only be to perpetuate captive populations but also to conserve animals and their habitats in nature; however, the two goals are not necessarily synonymous" (Hutchins 2003, 17). According to Robinson (1995, 11), zoos have primary and secondary messages that include "the fate of life on earth, environmental degradation and its causes, the need for conservation, the importance of zoos to conservation, actions citizens can take, and the exhaustion of biological and

other resources by human activities." Zoos need to make clear that their main mission is conservation, and conservation issues must be presented in clear and engaging ways (Olney 2005, 9; Swanagan 2000, 30).

An important aspect of zoos is how visitors interact with animals, which is impacted by visitor perceptions of animals. Many complaints are results of certain animal behaviors that could be viewed as negative to zoo visitors (Robinson 1995, 16). Robinson argues that "the most realistic looking habitat, constructed at great expense, and using all the refinements of design sophistication and construction genius, can fail if any of the animals behave in a distressing manner" (1995, 16). Because of the importance of how animals behave within their exhibit environments in zoos, it is vital that zoo designers and animal behaviorists work together to develop designs that meet all of the needs of the animals (Hutchins 2003, 20). Another important thing to look at is how the human-animal relationship has the potential to become a factor that contributes to the enrichment of the animal's welfare while in captivity. Claxton discusses how negative and positive interactions with humans affect how the animals react to zoo visitors, which could affect their behaviors (2011). Positive human-animal interactions have been linked to an increase in activity in captive animals and interaction with their environment, which in turn makes them more exciting to zoo visitors (Claxton 2011). Interactions and experiences that visitors can experience can be unique and different during each repeated visit (Manubay et al. 2002, 4).

Designers need to consider how visitor emotions are affected by exhibits, and how visitor emotions can affect an individual's opinion about conservation. According to Packer and Ballantyne, "some visitors reported an emotional affinity or connection with the animals they saw; they reported trying to understand what the animals were feeling, or felt they had interacted or communicated with the animals" (2010, 29). Information that visitors were given about the dangers faced

by the animals (particularly the threats posed by human actions), seemed to stay in visitors' memories longer than factual information about the animals, and these emotions aroused feelings of protectiveness and concern. As a result, people looked at their own role in relation to the environment and began to take more responsibility as an individual, and in some cases resulted in direct action. (Packer and Ballantyne 2010, 29). Emotion can also be linked to education, because some people believe that it is an important factor in 'free-choice learning' (Falk and Gillespie 2009, 112).

The role of education in zoos is seen as central to promoting wildlife conservation. Zoos provide opportunities for education through direct experiences, where learning is voluntary and motivated by the visitor (Packer and Ballantyne 2010, 26). This could "potentially provide a very learner-centered experience, which involves exploring and examining, making choices, making personal connections, developing one's own way of understanding, and controlling one's own learning environment" (Packer and Ballantyne 2010, 26). Visitor motivation is important when it comes to learning. Learning in schools is different from people choosing to learn something, because it is all about goals that relate to the individual person. The motivation of an individual to learn can be related to their perception of the places they are visiting and experiencing. User perception of a place can also be related to entertainment. Visitors are more inclined to learn if something is fun to do. Zoos can offer entertaining ways of learning as they offer visitors "an experience in which education is entertainment, discovery is exciting, and learning is an adventure" (Packer and Ballantyne 2010, 27).

Free-choice learning is impacted by prior knowledge, prior interest, and prior experience (Falk et al. 2007, 7). People who are participating in free-choice learning are coming to zoos because they are interested for themselves, therefore, they have a greater motivation to be educated about species.

Siberian Tiger

As important as it is to understand the history of zoos and zoo visitors, it is just as important to understand characteristics and needs of animals included in exhibit design for Sunset Zoo.

Type: Mammal
Diet: Carnivore
Size: 10.75 ft
Weight: 660 lbs
Lifespan: 10-15 years, up to 20 years in captivity
Protection status: Endangered

In the last 100 years the habitat destruction and hunting have drastically reduced the number of tigers in the wild from hundreds of thousands to between 3,000 and 5,000 (National Geographic, 2015). Siberian, or Amur, tigers are the largest cats in the world, and live mainly in the forests of Russia (National Geographic, 2015). According to National Geographic (2015), "there are an estimated 400 to 500 Siberian tigers living in the wild".

Threats facing tigers include: being hunted, habitat destruction and fragmentation, reduction of available prey, and increased proximity to humans (Panthera, 2015). Habitat loss and fragmentation is occurring because of agriculture, logging, and land conversion for domestic animals to graze. Since tigers need large areas of habitat for maintaining populations, fragmentation is causing tiger populations to become isolated from one another (Panthera, 2015).

Habitat + Distribution

Siberian tigers live mainly in the birch forests of eastern Russia, with some living in China and North Korea. In the summer the tigers reside in the forests and bush-covered mountains, and in the winter they move to the lower altitudes, which include grassland areas. The woodlands allow the tigers to space to roam and hunt for prey (National Geographic, 2015).

Physical Characteristics

The Siberian tiger is a rusty red, or rusty yellow, with black stripes. It has a scruff of fur around its neck that is more developed than the other tiger subspecies, and helps protect it from the cold environment. Adult males may weigh up to 660 pounds and measure around 10.9 feet in length. Females may weigh between 200 and 370 pounds and measure about 8.5 feet in length (National Geographic, 2015).

Tigers are able to jump forward distances of 32 feet, because of their hind legs being longer than their front legs. The bones and ligaments in their feet allow them to withstand impacts from running and jumping. Their claws are curved, which, combined with their size and weight, make climbing down from trees difficult (Panthera, 2015).

Behavior

Tigers are solitary animals, and will mark their territories to keep rivals away. The size of a tiger's territory depends on the area, season and availability of prey. Tigers tend to be more active at night and less active during the daytime, but may change based on the seasons and activity of prey. They may travel miles in search of prey. Tigers are also powerful swimmers and will go into water to cool themselves off (Seaworld, 2015). Because of their solitary nature tigers usually only interact with other tigers to mate. On average, tigers have three cubs per litter (Panthera, 2015).

Diet + Eating Habits

Tigers eat a variety of prey, but their diet mainly consists of hoofed animals such as deer and wild boar. When hunting, tigers use their sense of hearing and sight. They will stalk their prey and attempt to kill it with a bite to the neck or throat. Tigers are estimated to consume about one deer-sized animal each week (Seaworld, 2015).

Sloth Bear

Since I am redesigning two exhibits, it is important to understand the differences between the tiger and sloth bear.

Type: Mammal
Diet: Omnivore
Average life span in captivity: Up to 40 years
Size: 5-6 ft
Weight: 120-310 lbs
Protection status: Threatened

Sloth bears are from Asia, and can be found in forest areas with rock outcropping (National Geographic, 2015). According to National Geographic (2015), sloth bears "are threatened by habitat loss and sometimes captured for use in performances or hunted because of their aggressive behavior and destruction of crops". Little is known about the behavior and ecology of sloth bears, but they are important in dispersing seed throughout their habitats (San Diego Zoo, 2015).

Habitat + Distribution

Sloth bears live primarily in the wet or dry tropical forests of South Asia. Their habitats include forests and rocky areas ("Sloth Bear Fact Sheet - National Zoo," 2015).

Physical Characteristics

Sloth bears have an unkempt black coat, cream-colored snout, and a white marking on their chest. Adults weigh about 290 pounds on average, with males being larger than females. They measure 2 to 3 feet at the shoulder and measure between 5 and 6 feet in length (National Geographic, 2015).
The snout and tongue of the sloth bear is long, and they have a gap in their front teeth that allow them to suck insects out of nest mounds. The claws of the sloth bear are sickle-like and help them in foraging for food in the trees (National Geographic, 2015).

Behavior

Sloth bears are solitary in nature except during the breeding season. The sloth bear does not hibernate in the winter, but they do use dens for protection. The sloth bear is also nocturnal, foraging for food at night to avoid heat during the day (National Geographic, 2015).

Diet + Eating Habits

Sloth bears are omnivores, and their diets consists mainly of termites and ants, but they will also eat a variety of fruits and flowers, including mango and fig (National Geographic, 2015).

Chapter Summary

In the more recent years zoos have changed their focus to education and conservation. Zoos today can create exhibits that focus on the welfare of animals while also offering visitors unique experiences. Although there has been a shift towards scientific, aesthetic, and ecological values, designers are often faced with the challenge of redesigning within zoos that were built without taking these ideals into account.

03
methods

Introduction

The tiger and sloth bear exhibits are located in the southwest corner of Sunset Zoo, and are a part of the Asian Trail. Major issues with the site are the severe topography, lack of a viewing area for visitors, and almost nonexistent educational features.

With the dilemmas in mind, the primary research question for the project asks: How can individual zoo habitats be designed in ways that encourage education about conservation of wildlife and habitats?

This primary question leads to sub-questions that must be addressed:

How do visitors interact with exhibits?
Methods: Direct observations, interview.

What types of programs and activities are being used to educate visitors?
Methods: Direct observations, literature, interview.

Are existing educational methods successful?
Methods: Direct observations, interview, precedent studies.

Methodology Overview

The research methodology for this project is aimed at redesigning tiger and sloth bear exhibits along with viewing areas that best utilize findings from literature review, precedent studies, direct observations, and an interview with a zoo professional.

Precedent Study Methods

A series of precedent studies were used to identify educational programs and design considerations for animals, keepers, and visitors in existing zoos and exhibits. When designing a habitat or viewing area it is important to know what has been effective or ineffective

in past designs. Analysis of applicable precedents can help offer insight to dilemmas, identify solutions, and determine possible opportunities. When studying precedents for overall zoos and their educational programs, I selected zoos that have accreditation from the Association of Zoos & Aquariums, existing educational programs, and proximity of zoo to Sunset Zoo. I then chose four precedents that focused specifically on tiger and sloth bear exhibits. Factors that contributed to choosing these focused precedents included: species focus, availability of information, exhibit opening dates within the last 15 years, and exhibits with a focus on conservation.

Observation Methods

Observations were important, because the observations were vital to see how people interacted with exhibits, how many people visited exhibits, how long people spent at exhibits, whether or not people read signage at the exhibits, and how active the animals in the exhibit were. Initial observational studies were attempted at Sunset Zoo, but a critical number of visitors was not met. Because of this, observational studies were performed at the Sedgwick County Zoo in Wichita, Kansas. Observational study data was recorded and mapped on a drawing of the viewing area of various exhibits. Exhibits that were observed at the Sedgwick County Zoo include: the gorilla exhibit, the tiger exhibit, the otter exhibit, and the pelican and penguin exhibit. In addition to observing the visitors and animals from the viewing, it was important to observe the approach to the viewing area, habitat enclosure, and how close visitors could get to the animal habitat.

The exhibits were observed for 30 minutes each on three different weekends, totaling 1.5 hours spent at each exhibit.

Observations were recorded by maps and notes. When mapping the observations, a basemap was drawn for recording where activities occurred. While mapping activities of visitors within the sites, notes were taken to offer more detail on specific activities and behaviors of visitors.

Interview Methods

An interview with the Scott Shoemaker, the director of Sunset Zoo, helped determine how existing educational programs are functioning within the Sunset Zoo.
Questions that were asked included:

1. How do you think zoos contribute to people's understanding and perceptions of animals and their conservation?

2. How do you think zoos contribute to the ways people behave towards animals?

3. How can these impacts be increased? What is successful?

4. What existing educational programs does your zoo offer?

5. Do the educational programs focus on certain age groups?

6. Do you think that these programs are successful?

7. Do you think that these programs could be improved upon? How?

8. Are there any final thoughts you would like to add?

Design Application Process

After collecting data by using the methods mentioned above, the data was analyzed to determine ways to successfully encourage visitor education within the tiger and sloth bear exhibits at Sunset Zoo. Before beginning the design process, a site inventory and analysis was conducted to help determine how and where program elements could be applied within the site. After the site inventory and analysis was completed, opportunities and constraints were identified and a program was developed. Once these steps were completed, I moved forward in the design process by diagramming relationships between program elements and activities. After developing preliminary designs, I selected a design to continue developing and refining.

Chapter Summary

The research methodology for this project was aimed at creating a design strategy for the tiger and sloth bear exhibits at Sunset Zoo that is based upon a synthesis of literature, observations, precedent studies, and site analysis. This methodology is appropriate for the project because each method responds to the needs of the stakeholder, animals, and visitors.

04
precedent studies

Introduction

A series of precedent studies were used to identify educational programs and design considerations for animals, keepers, and visitors in existing zoos and exhibits. When designing a habitat or viewing area it is important to know what has been effective or ineffective in past designs. Analysis of applicable precedents can help offer insight to dilemmas, identify solutions, and determine possible opportunities.

I chose to look at six different precedents for this project. The first two precedents focus on the overall zoo and their existing educational programming. Factors that contributed to choosing these precedents included: accreditation by the Association of Zoos & Aquariums, existing educational programs, proximity of zoo to Sunset Zoo, and popularity of zoo with the public. Four precedents are focused specifically on tiger and sloth bear exhibits. Factors that contributed to choosing these precedents included: species focus, availability of information, opening dates within the last 15 years, and exhibits with a focus on conservation.

Sedgwick County Zoo

Wichita, KS

Year Opened: 1971

Total Acres: 247 acres

Number of Animals: 3,000

Number of Species: 400

Educational Programs:

- Learning Adventures
- Wonders of Wildlife Workshops
- ZOOper Kids
- Learning Programs
- Social Hours
- Zookeeper Apprentice Program
- Keeper Chats

There are a variety of programs that cater to different age groups within Sedgwick County Zoo programming. To educate younger children, the Sedgwick County Zoo focuses on creating fun and interactive learning experiences with play. There is a preschool program that is animal themed for children ages 3 through 5. These educational programs often allow children the opportunity to begin to learn and understand animals and their needs.

In addition to having focused programs for younger children, there are also programs that focus on all the different age groups, from high school students to senior citizens. Workshops offer visitors the chance to learn about animals in fun and innovative ways. Since the zoo is focused on educating people of all ages, having programs for adults is vital. Learning programs, social hours, and FrogWatch USA all allow visitors to learn more about animals while having fun and being social.

Keeper chats allow visitors the chance to interact with keepers. Keepers convey

messages about conservation, while also educating visitors about the animals, their natural habitats, and animal enrichment. The zoo also offers visitors the opportunity to participate in controlled animal feedings, like the giraffe feeding (Figure 4.1). Visitors can get up close to the animals, which creates a connection between the visitors and the animals. It also allows people to form lasting memories.

Figure 4.1 Giraffe Feeding Sign

Henry Doorly Zoo

Omaha, Nebraska

Year Opened: 1894

Total Acres: Over 130 acres

Number of Animals: 17, 000

Number of Species: 692

Educational Programs:

- Day Classes
- Day / Summer Camps
- Guided Tours
- Living Classrooms
- Student Workshops
- Outreach Program
- Distance Learning

Omaha's Henry Doorly Zoo and Aquarium has 15 certified teachers and science educators on staff, and 60 part-time staff and over 450 volunteers (Henry Doorly Zoo, 2015). The zoo offers programs for visitors of all ages. From day camps to distance learning, there is something for everyone. The zoo has a partnership with local educational institutions, offering a kindergarten program as well as having a high school on zoo grounds.

Day classes are offered 7 days a week for children ages 1 to 18. They are allowed to experience math, science, and the zoo world of natural habitats around the world. There are also summer camps for students, with teachers guiding students with educational activities, tours, and games.

Guided tours allow classes or groups to be lead around the zoo. Living classrooms let students get hands-on experience and learn about a variety of topics. Student workshops focus on

expanding students' problem-solving skills and critical thinking skills with hands-on activities, and topics include: sharks, animal behavior, behavioral husbandry, and amphibian field sampling.

The zoo's outreach program and distance learning allow live programs to be brought directly to the students.

Top: Figure 4.2 Desert Dome
Bottom left: Figure 4.3 Seal Demonstration
Bottom right: Figure 4.4 Interactive Bird Feeding

Asia Trail Sloth Bear Exhibit

National Zoological Park

Washington, DC

Design:

- Landscape Architects: Nelson Byrd Woltz Landscape Architects, Charlottesville
- Architects: Chatelain Architects, Washington DC

Opening Date: 17 October 2006

Client: National Zoological Park

Size: 24,000 square meters

Capacity: 4

Description:

The Asia Trail was the first phase in a 10 year renovation at the National Zoo. The exhibits within the trail were designed to encourage natural behaviors from animals through multi-sensory exhibits and close encounters between visitors and animals. Within the exhibit visitors can observe the animals and learn about conservation dilemmas through photographs, illustrations, and sculptures.

The design uses wood decking, resin-aggregate paving, and a rustic and modern mix of materials. Artificial boulders and cliffs are located throughout the exhibit. The materials were selected because of their ability to strengthen the themes of place and culture as a way of encouraging conservation (Blond, 2007). The exhibit was designed as an immersion experience, using a fog system to imitate the mountains in China and water running over the visitor pathway.

Features Dedicated to Animals:

Throughout the outdoor areas enrichment is built into the exhibit. During the day, the animals spend their time in the outdoor spaces. These outdoor

Figure 4.5 Asia Trail Sloth Bear Exhibit

Figure 4.6 Sloth Bear Feeding

spaces have both natural and artificial rock, trees and fallen trees for climbing and exploring, which are used to draw the animals into view for visitors (Figure 4.5).

In addition to the outdoor exhibit space, there is also a building with holding areas for the bears which is connected to additional outdoor spaces. Hammocks, hidden fruits, food in rock crevices, and feeding cubs are used as enrichment devices for the bears to encourage natural behavior (Figure 4.6). To encourage the natural foraging behavior of the bears, holes were drilled into logs for treats and food to be placed within.

Features Dedicated to Keepers:

To assist in medical or physical examination, the bears are trained to respond to a baton and position various body parts through the caging (Blond, 2007). Door operations, security cameras, and automatic latches were

implemented in the design to make management of the animals and their exhibits easier and safer for keepers.

Features Dedicated to Visitors:

The Asia Trail has over 80 trained volunteers that interact with visitors, telling them stories about the animals and their native habitats (Figure 4.7). In addition to volunteers, there are keeper demonstrations performed that include sloth bear termite mound feeding. Demonstrations by the keepers allow visitors to see natural behavior of the animals.

A variety of different spaces, from larger group areas to smaller, more intimate areas, encourage visitor experiences (Figure 4.8). Rocks and stone walls are used for visitor seating, and trees and shade structures offer relief from the sun. Glass panes allow visitors to get up close and personal with the animals, and moats reduce the amount of visual interference.

Conservation:

Within the plaza important conservation efforts are highlighted for visitors to learn about. Visitors can read about conservation programs that empower people to save habitat. Photographs show what life is like in an Indian village and how conservationists are working with the local farmers to reduce overgrazing from their cattle (Blond, 2007). Interactive areas allow visitors to become aware of the challenges of saving sloth bears in their native environment.

Top left: Figure 4.7 Sloth Bear Demonstration
Top right: Figure 4.8 Sloth Bear Exhibit Viewing Area
Bottom: Figure 4.9 Two Sloth Bears

Sloth Bears + Rhesus Macaques

Zoo Leipzig

Leipzig, Germany

Design:

• Architecture/Landscape Architecture: Rasbach Architects, Oberhausen, Germany

Opening Date: 28 March 2000

Client: Zoo Leipzig

Size: 3,036 square meters

Capacity: 10 sloth bears, 15 rhesus macaques

Description:

The sloth bear and macaques exhibits include two separate outdoor areas and a building for the animals when they are not in their outdoor exhibit. To divide the outdoor space into separate areas, there is a dry moat running between them.

Visitors can see both of the exhibits, so it gives the illusion of them being connected, which adds to the depth of the exhibit. To disguise barriers and the holding building artificial rock is used throughout the exhibits.

Features Dedicated to Animals:

There are both indoor and outdoor areas that are not accessible for visitors, which allow the bears to have some privacy when breeding is occurring. The species have their own entrance and exit doors which are placed at different heights to avoid competition between the two species. The outdoor areas also include fallen trees for climbing activities (Figure 4.10).

Features Dedicated to Keepers:

The indoor and outdoor areas are all connected, making it easy to move the animals around. In the off-exhibit areas, the barriers are made from bars, so keepers may reach into the enclosures.

Figure 4.10 Zoo Leipzig Sloth Bear Exhibit (Rasbach ®)

Figure 4.11 Zoo Leipzig Sloth Bear Viewing Cave (Rasbach ®)

Features Dedicated to Visitors:

Artificial cracks in the rocks allow visitors to peak into areas, and a cave creates a unique experience and view for visitors (Figure 4.11). In addition to be able to view the animals in the regular exhibit, there is also a monitor that shows visitors the off-exhibit area where mothers and their babies are kept.

Signage in the viewing area allows visitors to read about the feeding habits of the bears. Speakers within an artificial mound let visitors hear the sound of a bear eating.

Conservation:

The zoo is a participant in the European Endangered species Program (EEP) for sloth bears, and has successfully bred them in the past (Worstell, 2004).

Tiger Lair + Tiger Base Camp

Minnesota Zoo

Apple Valley, Minnesota

Design:

• Site Analysis – Construction Documents: Damon Farber Associates, Minneapolis, MN

Opening Date: 8 June 2002

Client: Minnesota Zoo

Size: 14,904 square meters

Capacity: unknown

Description:

One goal of the exhibit was to improve guest experiences by increasing tiger visibility and activity. To do this, enrichment features were increased to encourage more natural behaviors and improve the tigers' well-being. The exhibit was designed to imitate the natural habitat of the tigers, and allow them to roam (Figure 4.12). Features include: a pool for the tigers to play in, an immersive viewing area for visitors, and an education area for visitors that offers visitors a bird's eye view of the exhibit (Caron, 2004).

Features Dedicated to Animals:

Heating and cooling rocks provide places for the tigers to keep warm in the winter months and cool off in the summer months. In addition to providing comfort for the tigers, the rocks bring the tigers closer to the visitor viewing area. For enrichment purposes a replicated moose carcass is used to encourage the tigers to work for their food, stimulate them, and occupy them.

Features Dedicated to Keepers:

Enrichment features like the fake carcasses were designed with the safety of the keepers in mind, allowing them to place food in them from outside the exhibit.

Figure 4.12 Tiger Lair Exhibit

Figure 4.13 Tiger Next to Viewing Area

Features Dedicated to Visitors:

The Tiger Basecamp viewing area is a treetop level viewing area that is intended to create an immersive experience for visitors. The viewing area also educates visitors about techniques used when studying tigers in the wild with photographs and signage.

The Tiger Lair is the second viewing area which allows the guests to get face to face with the tigers. Floor to ceiling windows allow unobstructed views into the exhibit (Figure 4.13).

Conservation:

Visitors are allowed an opportunity to contribute to conservation, which helps them to form a connection to the tigers within the zoo and their wild counterparts. The exhibit looks at enrichment and behavior and makes comparisons between the tigers' natural habitats and where they are located.

Tiger Mountain

Bronx Zoo

Bronx, New York

Design:

• Exhibit Design: Exhibits and Graphic Arts Department, Wildlife Conservation Society, New York
• Architect: Cetra/Ruddy Incorporated, New York

Opening Date: 13 May 2003

Client: Bronx Zoo

Size: 6,390 square meters

Capacity: 6

Description:

The design of Tiger Mountain was guided by the Wildlife Conservation Society's (WCS) four criteria: the exhibit must be good for animals, guests, zoos, and conservation (Merlino, 2006). The exhibit offers up close encounters with the tigers and views of the tigers' naturalistic exhibit (Figure 4.14). Within the viewing areas film, digital media, and interactive graphics educate visitors about global efforts to save tigers.

Features Dedicated to Animals:

Enrichment activities stimulate the tigers and fascinate visitors. Enrichment features include: cool rocks for the summer months, hot rocks for the winter months, a tiger-activated rock that sprays a fine mist, a watering hole, and pull toys (Wildlife Conservation Society, 2003).

The enclosures have a special door that allows for limited contact between tigers for potential mating (Wildlife Conservation Society, 2003).

Features Dedicated to Keepers:

The holding buildings were designed to give keepers varied views of the tigers. Stainless steel mesh training wall protects keepers from getting injured by

Figure 4.14 Tiger Mountain Exhibit

the tigers. Secondary doors are located so keepers can see animal corridors before entering the spaces. In addition to safety features, the keepers have access to the rooftops, where they can monitor the tigers' activities, inspect the exhibits, and dispense enrichment items.

Features Dedicated to Visitors:

Touch screens are accessible by all, the tiger exhibits are elevated slightly above the viewing area to allow prime viewing for visitors. The exhibits' messages are conveyed to visitors through live programs, digital media, and graphics. To get visitors excited about the tigers and to educate them, enrichment and training sessions are used to educate guests about zoo efforts to enrich the lives of animals.

Keepers interact with guests, explaining why enrichment is so important for the tigers and answer any questions they may have. Digital tough screens are available for visitors that prefer independent learning and exploration.

Conservation:

Stories, photographs, and videos of researchers and zoo staff are available for visitors to see. There is an opportunity for visitors to sign up via email to receive additional information about conservation efforts.

Left: Figure 4.15 Tiger Enrichment Demonstration
Right: Figure 4.16 Tiger Feeding

05
observations + interview

Observational Studies

I conducted observational studies to determine how people interacted with exhibits, how many people visited exhibits, how long people spent at exhibits, whether or not visitors read signage at the exhibits, and how active the animals were.

Observations were conducted at Sedgwick County Zoo in Wichita, Kansas. Four different exhibits were observed on three different weekends. Total time spent at each exhibit was 1.5 hours.

Observation Findings

From my observation position at each exhibit, I was able to see the entire viewing area that visitors had access to. Visual identification was used to determine what people were doing throughout the viewing areas.

Exhibits that offered additional programming to signage and videos, such as keeper chats or scheduled feeding by keepers, increased the overall time visitors spent at an exhibit. Keeper chats are scheduled daily at certain species' exhibits, and involve keepers educating visitors about enrichment activities, struggles for the animals, and current conservation efforts. Scheduled feedings by keepers offered visitors the chance to see natural feeding behaviors from the animals, which created excitement and interest for visitors.

Visitors were also more likely to spend more time at the exhibits if the animals were close in proximity to the viewing area, if seating was readily available within the viewing area, and if the animals were being active. On two separate observation days at the tiger exhibit, there were tigers laying on a rock against the glass window of the viewing area. Visitors gathered around the area where the tigers were located to observe them and take pictures. If the animals were far away from the viewing area or not being active, visitors proceeded through the viewing area at a much faster rate, spending less than five minutes on average within the exhibit. Seating throughout the viewing areas was taken advantage of by many

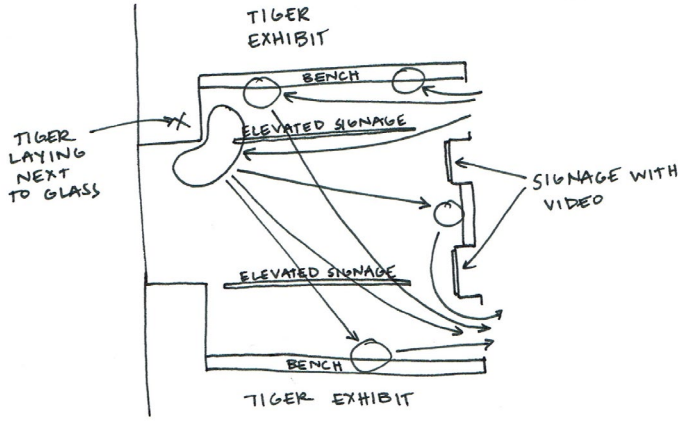


Figure 5.1 Observational Mapping Sample from Sedgwick County Zoo Tiger Exhibit

families or groups that were resting or having snacks while watching the animals. If there was no seating in an area, people were not likely to spend more than a minute or two in that area unless an animal was in close proximity. Active animals, like the penguins or otters swimming back and forth in their tanks, provided excitement for visitors. During every observation day at the penguin and otter exhibits, children were observed to be running back and forth alongside the animals while they swam.

Recorded observations show that out of 500 total visitors, only 16 visitors read or looked at signage, and only 19 visitors watched videos that were playing within the viewing areas. The majority of visitors that read signage or watched videos were children and their parents. Older visitors that were without children rarely read signage or watched videos.

While conducting observations I was able to identify three out of five of the different types of visitors, which included the explorer, the facilitator, and the experience seeker.

Interview

I conducted an interview with Scott Shoemaker, the Director of Sunset Zoo, to determine how the zoo is contributing to people's understanding and perceptions of animals and conservation and how existing programs are functioning within the zoo.

Interview Results

During the interview, Scott stated that people gain an understanding of the animals just by watching them move and interact with their environments, because it allows people to gain an appreciation of animals. This appreciation of animals leads to people caring about the animals and their habitats. When people care, they are more likely to want to learn and be educated about conservation efforts.

To encourage natural behaviors it is important to keep exhibits looking as natural as possible. It is also important to encourage enrichment opportunities for animals, because they get people interested and excited about what the animals are doing. Enrichment opportunities include rocks and logs for the animals to climb on and ways to show other natural behaviors.

To increase the impact that zoos are having on visitors it is important to keep challenging zoos and zoo officials to do more. Zoos are always trying to improve programs by surveying visitors and making improvements based on suggestions from visitors.

From the interview, it was noted that the majority of existing educational programs are focused on younger children to teenagers. Although there are some programs that are focused on adults, there are very few in comparison. Zoos are

Key Statements

- It is important that visitors see a variety of animals - every species is important.
- Keep exhibits as natural as possible to encourage natural behaviors from animals.
- Reach at least one person. Every person can make a difference.
- Existing programs are focused on young children all the way up to high school.
- There has been a shift towards healthier exhibits - bigger areas for animals to run and hiding areas to reduce stress.
- Animals in zoos are ambassadors for their wild counterparts.
- It is important to educate and inspire people to make a difference, so species do not become extinct.

06
design goals + program

Goals

Sunset Zoo has the potential to educate visitors about the importance of conservation of wildlife and their habitats and make a lasting impression on visitors. The first goal of a redesign of the tiger and sloth bear exhibits is to create naturalistic exhibits that meet the needs of the animals.

The second goal of the redesign is to encourage the education of visitors about conservation of wildlife and habitats. Conservation is vital, because without it, some species will cease to exist in the wild. To convey these messages to visitors, the visitors must first care about the animals. To get the visitors to care, connections between the visitors and the animals must be formed and encouraged.

The third goal is to create exhibits and viewing areas that will allow the five types of visitors to have unique experiences and lasting impressions.

Objectives

- Include pools in both tiger and sloth bear exhibits for drinking and swimming.
- Create nodes for keepers and volunteers to talk to visitors.
- Offer seating throughout viewing areas and walkways.
- Provide an artificial carcass and artificial termite mounds to encourage natural feeding behaviors from the tiger and sloth bear.

Guidelines

Design guidelines will be used to inform design decisions.

In the redesign of the tiger and sloth bear exhibits, it will be important to encourage natural behaviors from the animals, which can be achieved by imitating the species' natural habitats as closely as possible. A naturalized habitat will also help reduce stress and discomfort for the animals.

Exhibit Design Strategies + Rationales

Goal	Strategy	Rationale
Provide animals access to water.	Pool.	Important for animals to have access to water for drinking and cooling off.
Create a naturalized habitat that is similar to the species' natural habitats.	Vegetation that mimics native habitats	In creating a naturalized habitat it is important to imitate the species' natural habitat as closely as possible.
Reduce stress of animals.	Provide hiding areas for animals	Areas for the animals to hide from visitors reduces stress.
Demonstrate natural behaviors of animals and provide stimulation for animals.	Environmental enrichment features	Objects that the animals can climb, scratch, or play with reduce boredom and stress for animals in captivity. These could include hard plastic balls, logs for scratching or hiding food, and heated/cooled rocks.
Offer comfortable spaces for animals.	Shade areas	Shaded areas are important, as they provide comfort for the animals.
Offer spaces that stimulate animals.	Variety of spaces for animals	In the wild, animals have access to a variety of spaces that stimulate activity.

Table 6.1 Exhibit Design Strategies + Rationales

Visitor Strategies + Rationales

Goal	Strategy	Rationale
Provide access to all visitors.	Keep all ramps and walkways ADA accessible.	ADA accessibility is important, because all visitors should be able to experience the exhibit and viewing area.
Create an educational experience for visitors.	Create designated nodes for keepers and volunteers to talk to visitors.	From observational studies, it was evident that visitors prefered interacting with keepers over reading signage.
Provide areas where visitors can relax and watch the animals.	Provide benches throughout the viewing areas and along the main walkway.	Visitors are likely to spend more time at an exhibit if there is available seating.
Create a variety of viewing areas for visitors.	Different viewing areas will have different views.	It is important to create a unique experience for visitors.
Encourage interest and create excitement from visitors.	Include training sessions and feeding times for visitor viewing.	Interest and excitement from visitors is important when trying to create a connection between the visitors and animals.

Table 6.2 Visitor Strategies + Rationales

Design Program

The program is a list of features for the design. The list of program features was created by considering the design guidelines and the needs of a new exhibit. The program drives the design of the tiger and sloth bear exhibits and viewing areas.

Feature	Rationale	User	Source
Provide hiding areas within the exhibits.	Allows animals to relieve stress and get away from viewers if they want.	Tiger / Sloth Bear	Interview
Offer variety of spaces for animals.	With a variety of spaces, the animals can choose were they want to go within the exhibit.	Tiger / Sloth Bear	Literature Review
Offer pathways through the exhibits.	Pathways make it easier for the animals to get around the exhibit.	Tiger / Sloth Bear	Literature Review
Naturalized habitats - plants that imitate species' natural habitats, but are also suitable for Kansas climate.	Creates a sense of place by imitating the animals' natural habitat.	Tiger / Sloth Bear / Visitor	Literature Review Interview
Enrichment features.	Enrichment features reduce boredom and stress for animals and encourage natural activities that are interesting for visitors to see.	Tiger / Sloth Bear / Visitor	Literature Review Interview Observations Precedents
Pool.	Access to water for animals to drink and for cooling down.	Tiger / Sloth Bear	Precedents Literature Review
Preserve existing trees as much as possible.	Existing trees allow exhibit to fit into the surrounding context and offer shade for animals and visitors.	Tiger / Sloth Bear / Visitor	Site Analysis
Main viewing area with seating.	A main viewing area creates a destination for people to reach. Providing seating could encourage visitors to spend more time at an exhibit.	Visitor / Keeper	Observations
Smaller areas for keepers/volunteers to interact with visitors.	Visitors that want to interact with keepers and ask questions have the opportunity to learn from keepers or volunteers.	Visitor / Keeper	Observations
Screen holding building from visitor view.	Helps exhibit look natural.	Visitor	Literature Review Precedents
Screen boundaries and entryways.	Helps exhibit look natural.	Visitor	Literature Review Precedents
Create immersive experience for visitors.	An immersive experience will create a unique experience for visitors and encourage interest in conservation and education messages.	Visitor	Interview Precedents
Create educational experience for visitors.	Signage, photographs, videos, and keeper interaction to convey educational messages to visitors.	Visitor / Keeper	Literature Review Interview Observations Precedents
Provide a variety of viewing areas to engage different types of visitors.	A variety of a ages and people visit Sunset Zoo, so it is important to have experiences for everyone.	Visitor	Interview
Conservation message.	The purpose of zoos is conservation, so educating visitors about conservation is of the utmost importance.	Visitor / Keeper	Literature Review Interview

Table 6.3 Design Program

07

site inventory + analysis

Site Analysis

Inventory and analysis helped determine how program elements can be applied to the site. Inventory and analysis will also help determine the suitability of program elements to specific areas.

Sunset Zoo Context

Sunset Zoo was founded in 1933 in Manhattan, Kansas. The city of Manhattan obtained funding from the Works Progress Administration (WPA) for construction of walkways, buildings, and animal exhibits. In 1989 Sunset Zoo received accreditation by the American Zoo and Aquarium Association (AZA).

Sunset Zoo Map

The tiger and sloth bear exhibits are part of the Asian Trail, which also includes the gibbons, otters, and leopards. The Asian Trail is located in the southwest corner of the park.

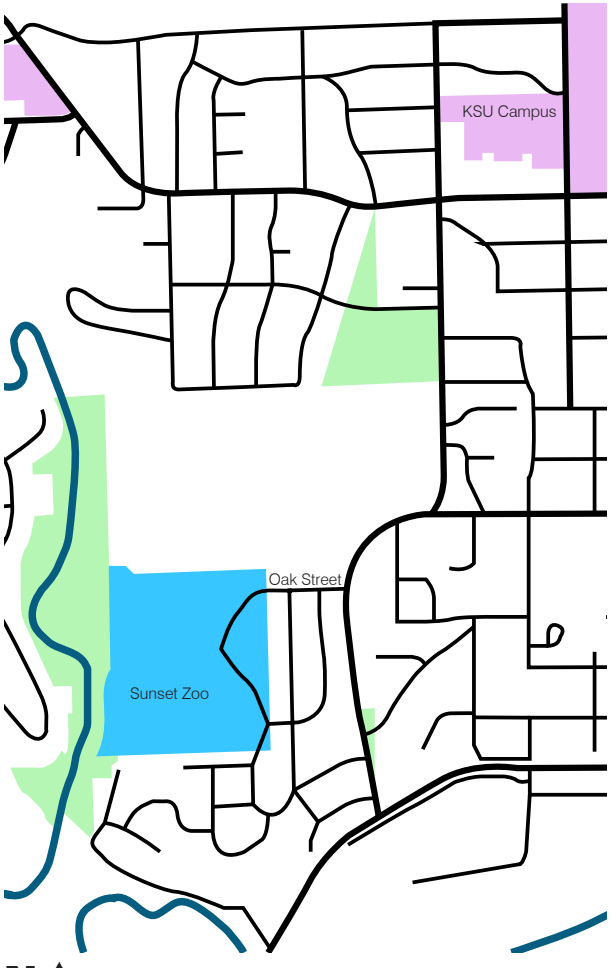


Figure 7.1 Sunset Zoo Context Map

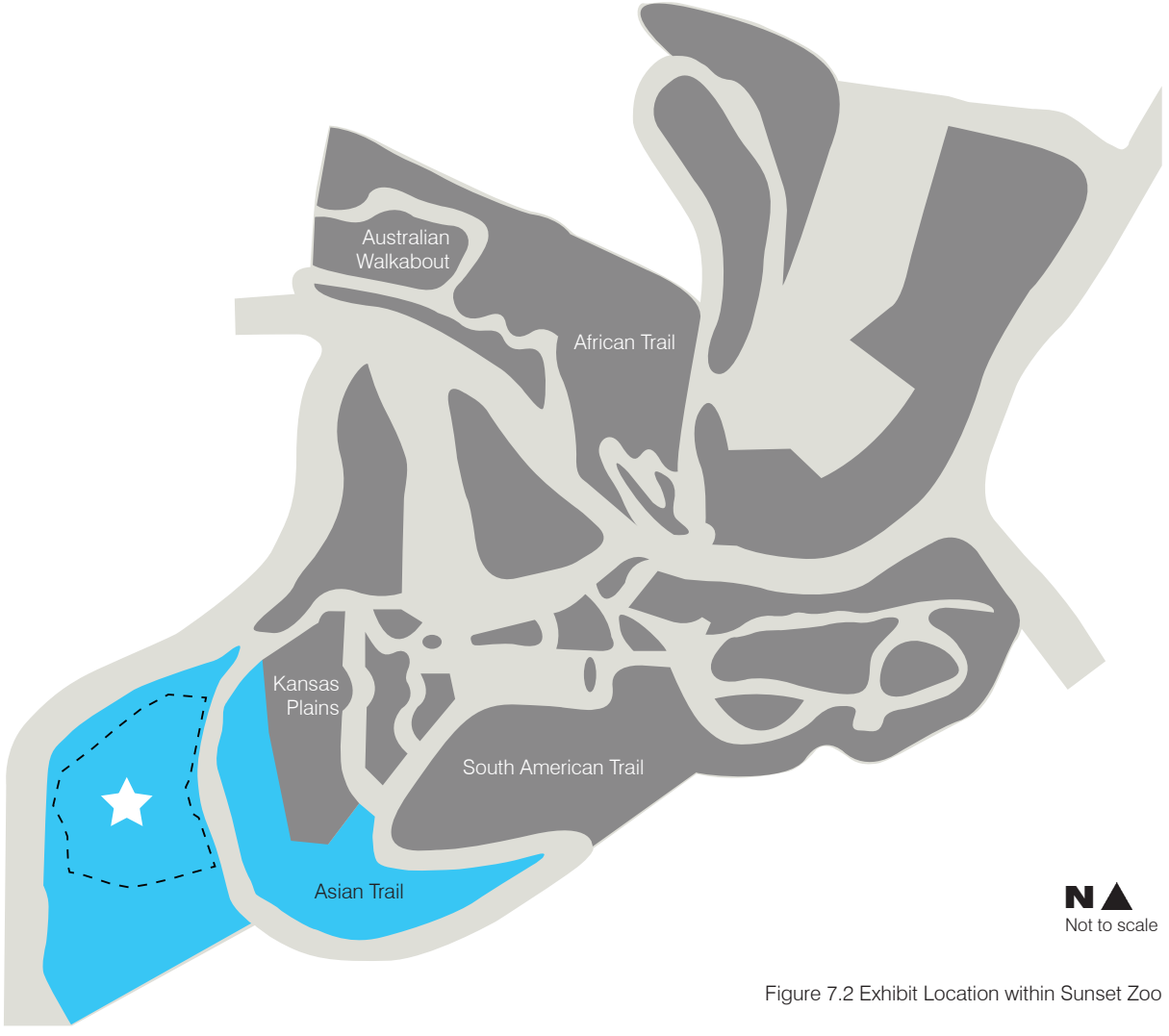


Figure 7.2 Exhibit Location within Sunset Zoo

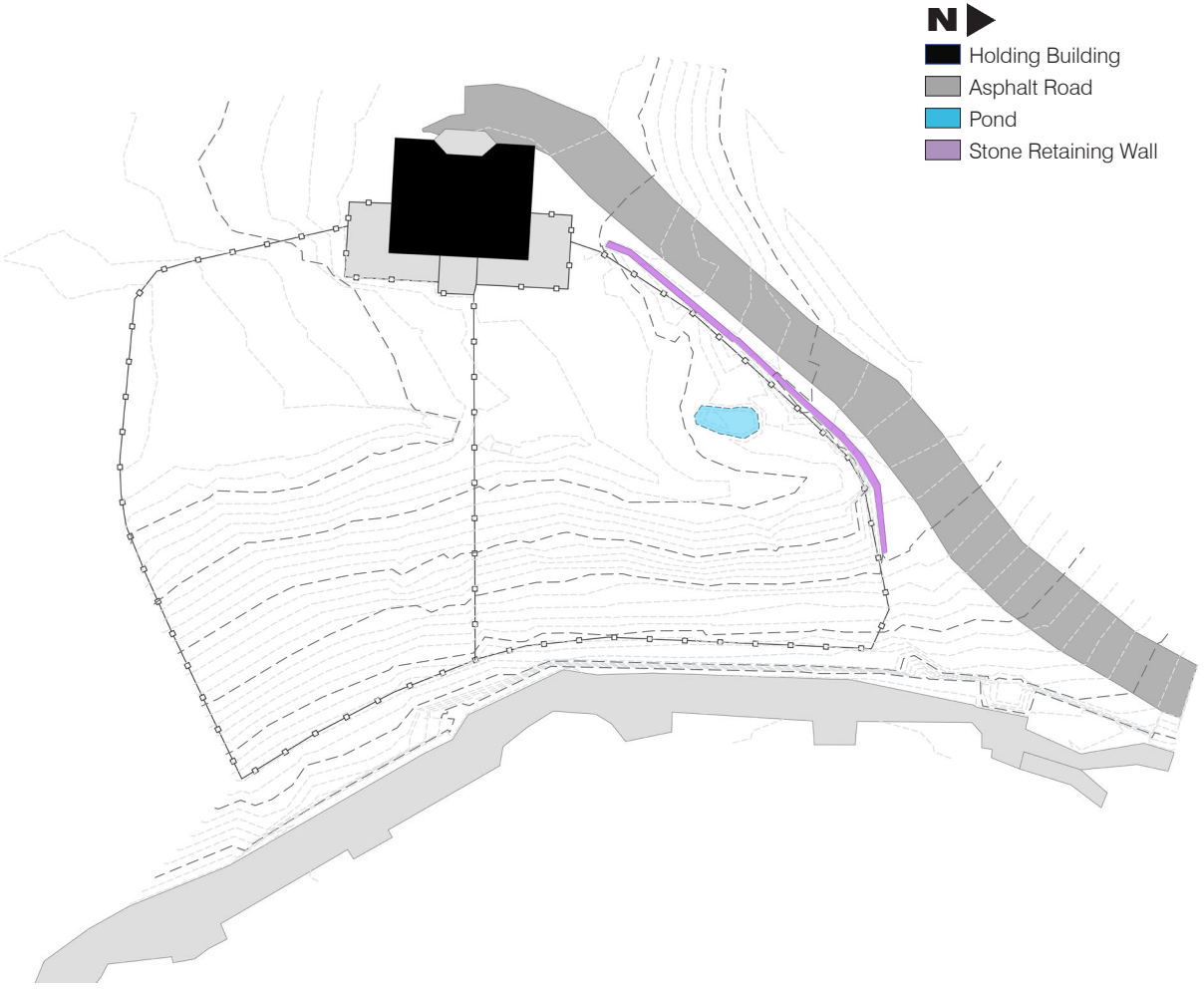


Figure 7.3 Existing Features

Existing Features

Both species have their respective holding areas in a building on the western edge of the exhibits. The tiger exhibit has a small concrete lined pool. Although the pool does provide the tiger with access to water, its appearance is not very naturalistic.

To the north of the exhibits is a steep asphalt road, which allows visitors to get to the bottom of the exhibits. With the redesigning of the habitats the zoo intends to remove visitor access and make the road service access only. Also along the road is a stone retaining wall.

The existing holding building for the tiger and sloth bear is located on the western side of the exhibits. To get the animals from their respective exhibits there is a common holding area for the animals once they are removed from their exhibits. From this common holding area the animals are then directed either north or south to their individual holding areas.

Top: Figure 7.4 Existing Holding Building
Bottom: Figure 7.5 Existing Retaining Wall + Road

Topography

There is currently 30 feet of grade change across the site. The highest point is on the eastern side of the exhibits. On the eastern edge of the exhibits there is a few down into the exhibit, and the western edge of the exhibit provides a ground level view up to the elevated side of the exhibits.

The extreme topography combined with the desire of the zoo to eliminate the asphalt road as a visitor walkway, makes locating a ground level viewing area difficult. To provide ADA access to a ground level viewing area, ramps that would take space away from the existing exhibits, would be required.

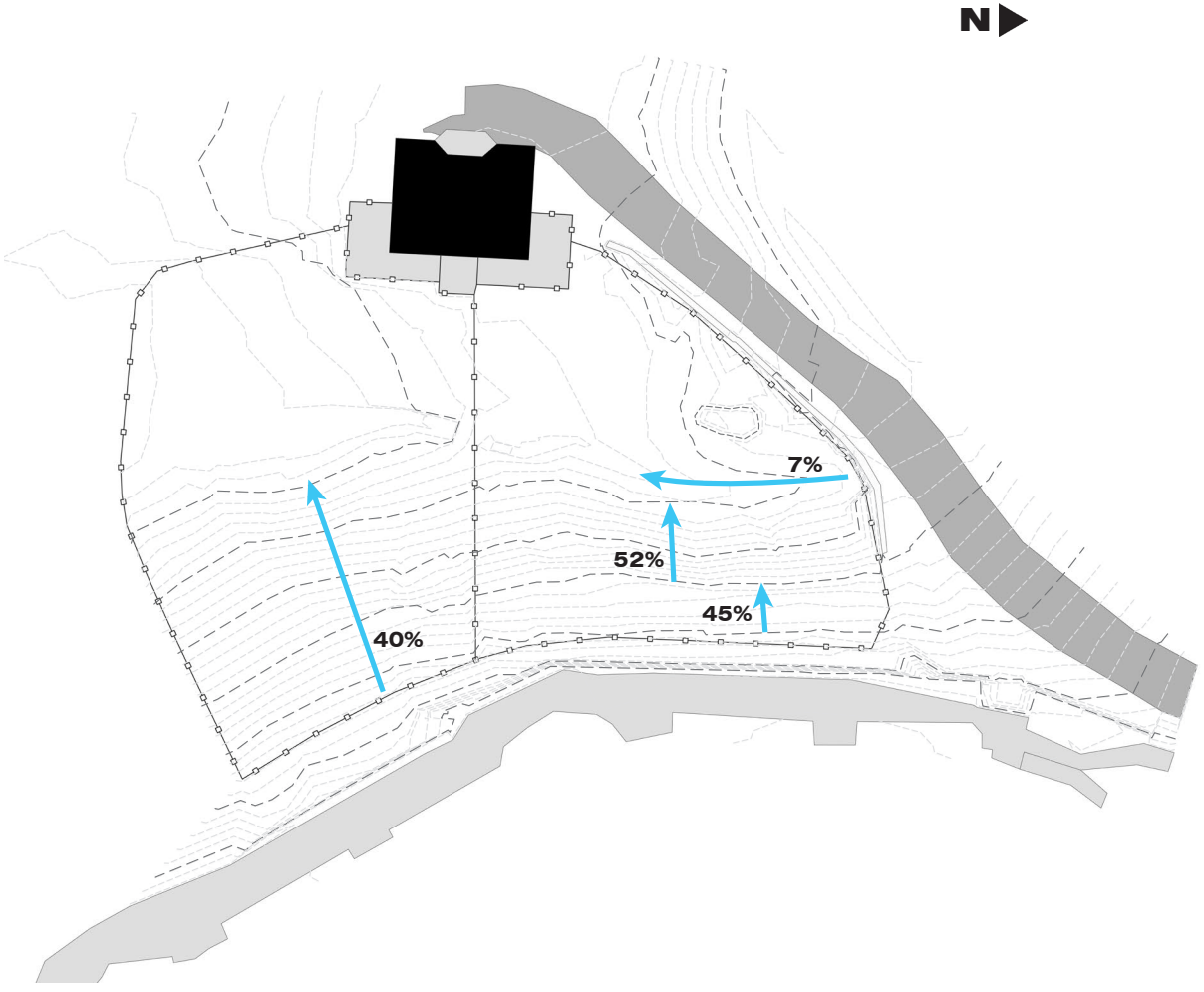


Figure 7.6 Existing Topography

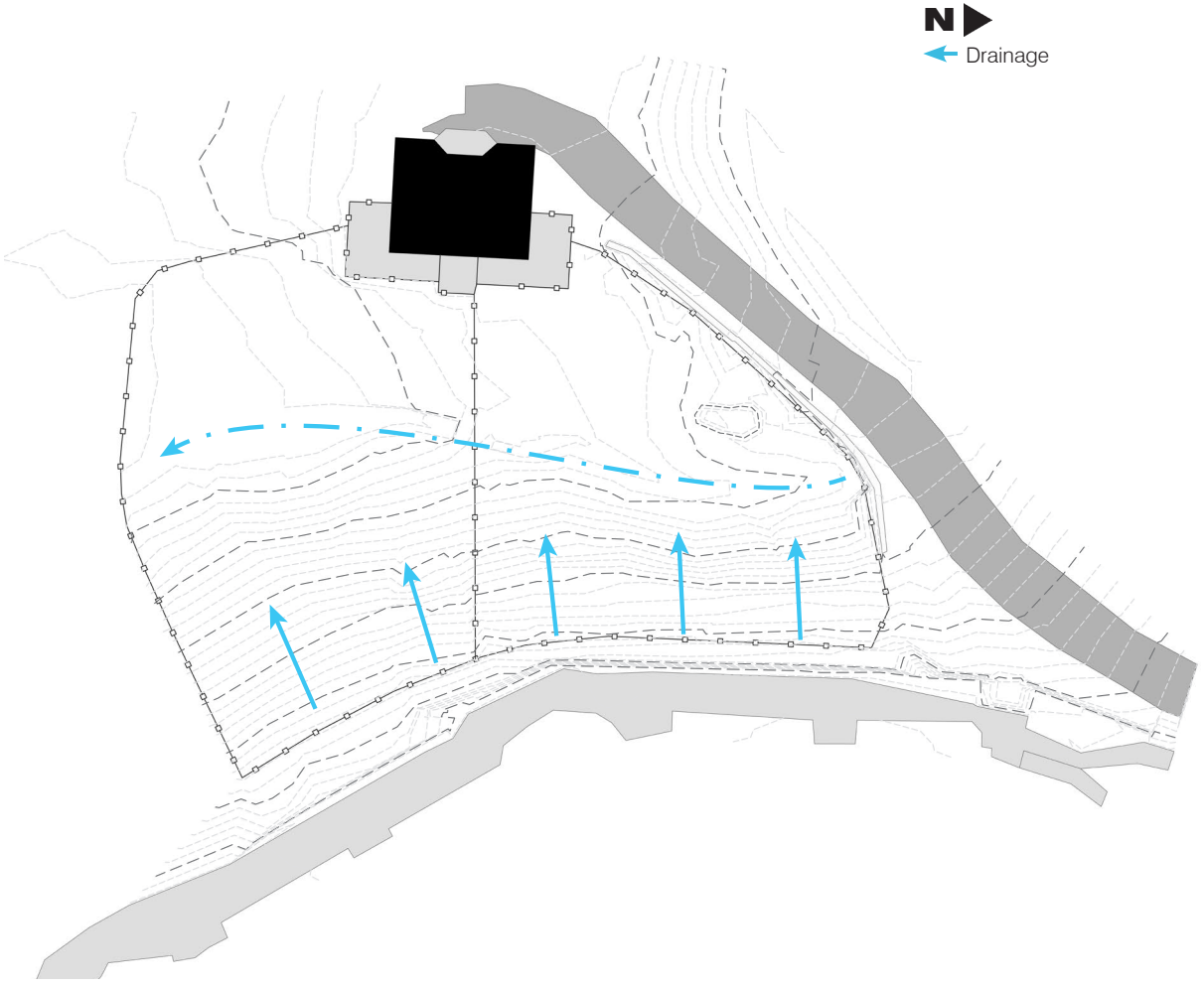


Figure 7.7 Existing Drainage

Drainage

The site drains from east to the southwest corner of the sloth bear exhibit. There is a concrete flume in the tiger exhibit near the dividing fence, and a concrete headwall in the sloth bear exhibit near the dividing fence. Since the exhibit is so heavily sloped, heavy storms could cause erosion across the site. The vegetation within the exhibits will help mitigate erosion potential.

Figure 7.8 Existing Drain

Figure 7.9 Existing Vegetation

Existing Vegetation

Within the exhibit and in close proximity to it are a number of mature trees. Both exhibits have canopy cover which offers protection from the sun and shade for the tiger and the sloth bear exhibits. There is also grass throughout both exhibits.

The existing trees provide a visual link to the surrounding areas. In addition to creating a link to the surrounding areas, the trees block unwanted views and could allow a visitor to be fully immersed in their viewing experience.

For security and safety the larger trees within the tiger exhibit have metal wrapped around them to deter any climbing.

Figure 7.10 Existing Trees within Exhibit

Fencing + Utilities

The existing tiger and sloth bear exhibits are divided by a chain link fence and surrounded by a chain link fence.

A sewage line runs underneath the concrete walkway on the eastern side of the exhibit. There is also a water meter located directly southwest of the tiger and sloth bear holding building. The location of the utilities in relationship to the exhibits will not affect design considerations.

Existing Division of Exhibits

There are currently two different areas, one for the tiger, and the other for the sloth bear. They are divided by a chain link fence running between them. The tiger exhibit is the located on the northern side, and the sloth bear exhibit is on the southern side.

Educational Programming

Although there are existing educational programs within the zoo, there is a severe lack of educational features aimed specifically for the tiger and sloth bear habitats. There are currently two signs on the edge of the sloth bear exhibit that offer brief descriptions of the species inhabiting the space. Other than signage for the sloth bear, there are no other educational features currently in place for these two exhibits.

There is potential for both the tiger and sloth bear exhibits to educate visitors about the species and their habitats. This experience is intended to create a connection between the visitor and the animals, which will allow them to understand and appreciate the species and their habitat. There is also the opportunity to educate people about what people can do in the United States to help conservation efforts.

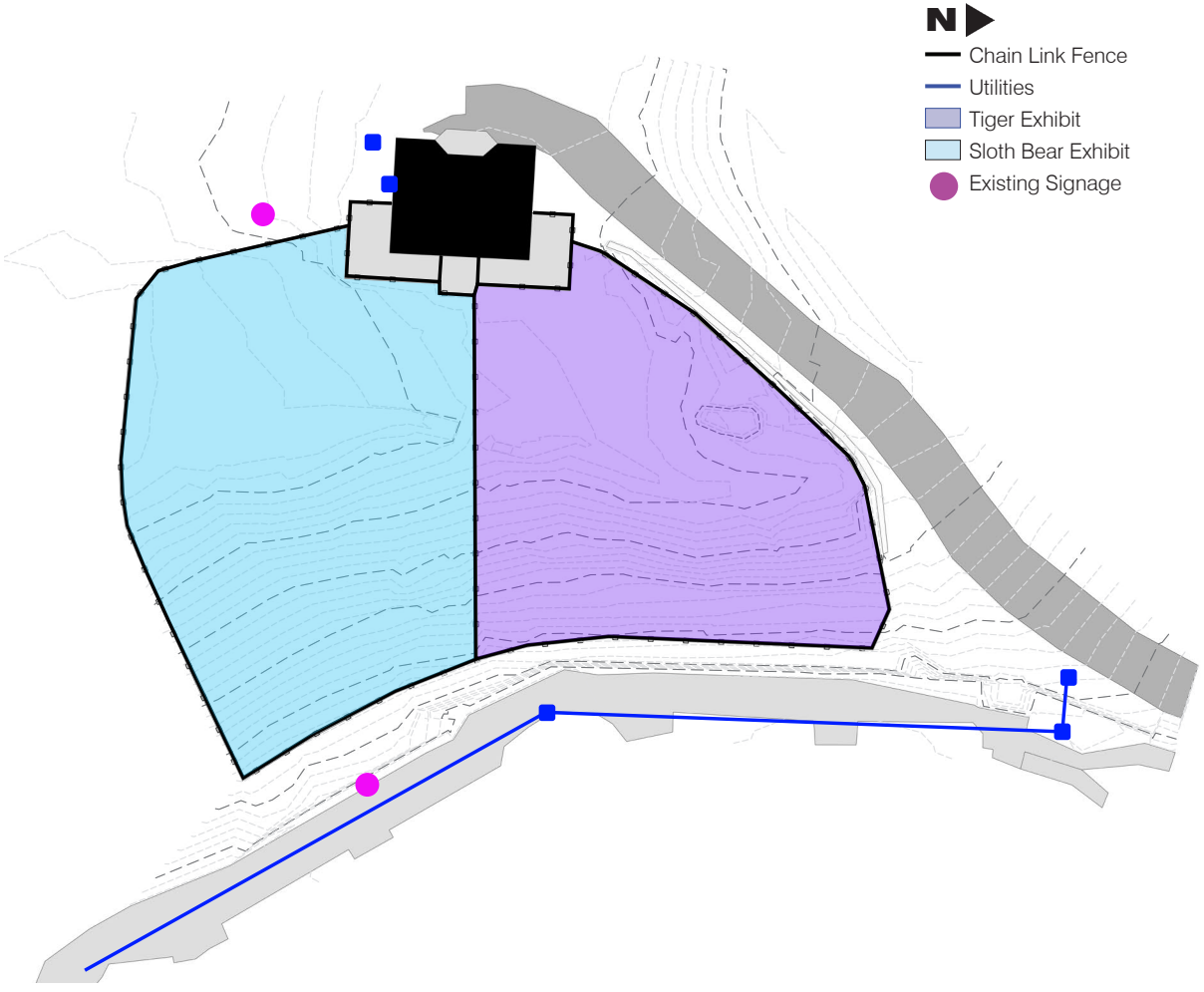


Figure 7.11 Existing Fencing, Utilities, Signage, + Division of Exhbits

Views + Visitor Access

Since the exhibits are on such a steep slope and heavily vegetated the distant views are limited. During the winter months, when the leaves have fallen off the trees, there may be some views to the surrounding vegetation. Since views outward are restricted there is an opportunity to create a very immersive experience for visitors to really feel like they are a viewing the animals' natural habitats. From the edge of the exhibits, visitors are able to see all the way across the exhibits, with only the fence obstructing their views.

With the current design of the exhibits, visitors can walk around the exhibits along the cement sidewalk on the eastern side of the exhibits, and the asphalt drive along the northern and eastern side of the exhibits. With the redesign of the exhibit, the asphalt road will not be accessible to visitors.

Figure 7.12 Views + Visitor Access

Chapter Summary

The site analysis aided in the selection and placement of program elements that were discussed in chapter seven. Opportunities and constraints were identified in Figure 7.16.

Opportunities

- Exhibits have good visibility and access from main circulation path
- Potential to enhance facilities for conservation education programs
- Potential to improve visitor experience
- Exhibits are able to be completely redesigned

Constraints

- Steep slope will affect drainage and design of the habitats
- Existing drainage through site presents challenges with stormwater drainage
- Restricting visitors from having access to asphalt road will limit ground level viewing opportunities

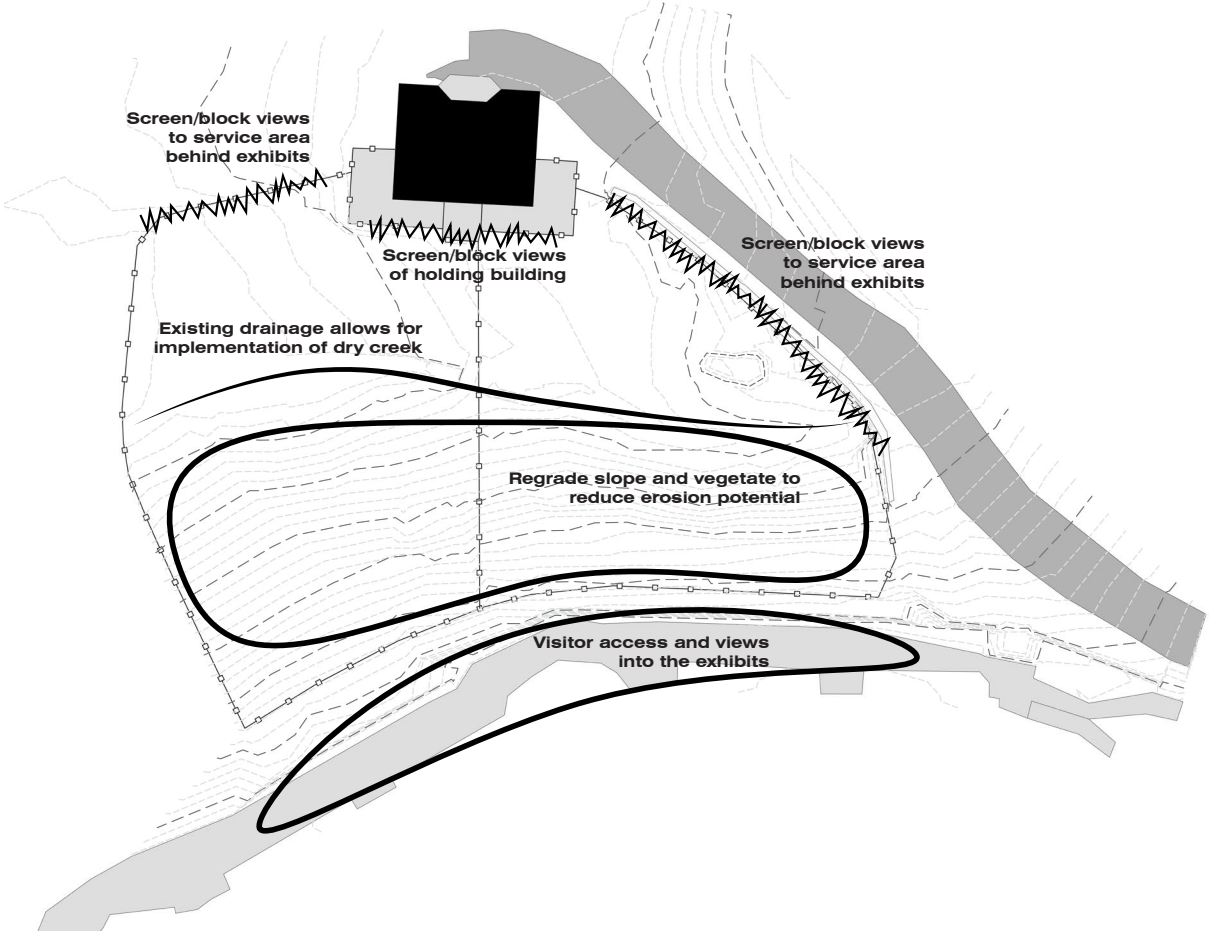


Figure 7.13 Summary Site Analysis Diagram

08
design

Design

The final site design was informed by design goals and guidelines as well as information collected from observations, an interview, precedent studies, and literature review. Within the tiger and sloth bear exhibits design features were used to create an exhibit that focuses on the well-being of the animals first. The second main goal was to create a unique experience for visitors that encouraged education about conservation of wildlife and their habitats.

General Overview

The main viewing area for the exhibit is located between the tiger and sloth bear exhibits, and is elevated above the ground level to be ADA accessible for visitors. The elevated viewing area allows visitors to see into the exhibit and witness animal activities from both species. Locating the viewing area within the exhibits creates an immersive experience for visitors, making them feel like they are entering the tiger and sloth bear habitats.

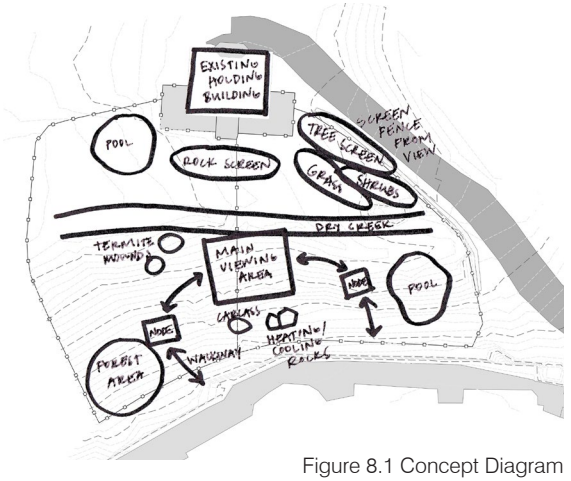


Figure 8.1 Concept Diagram

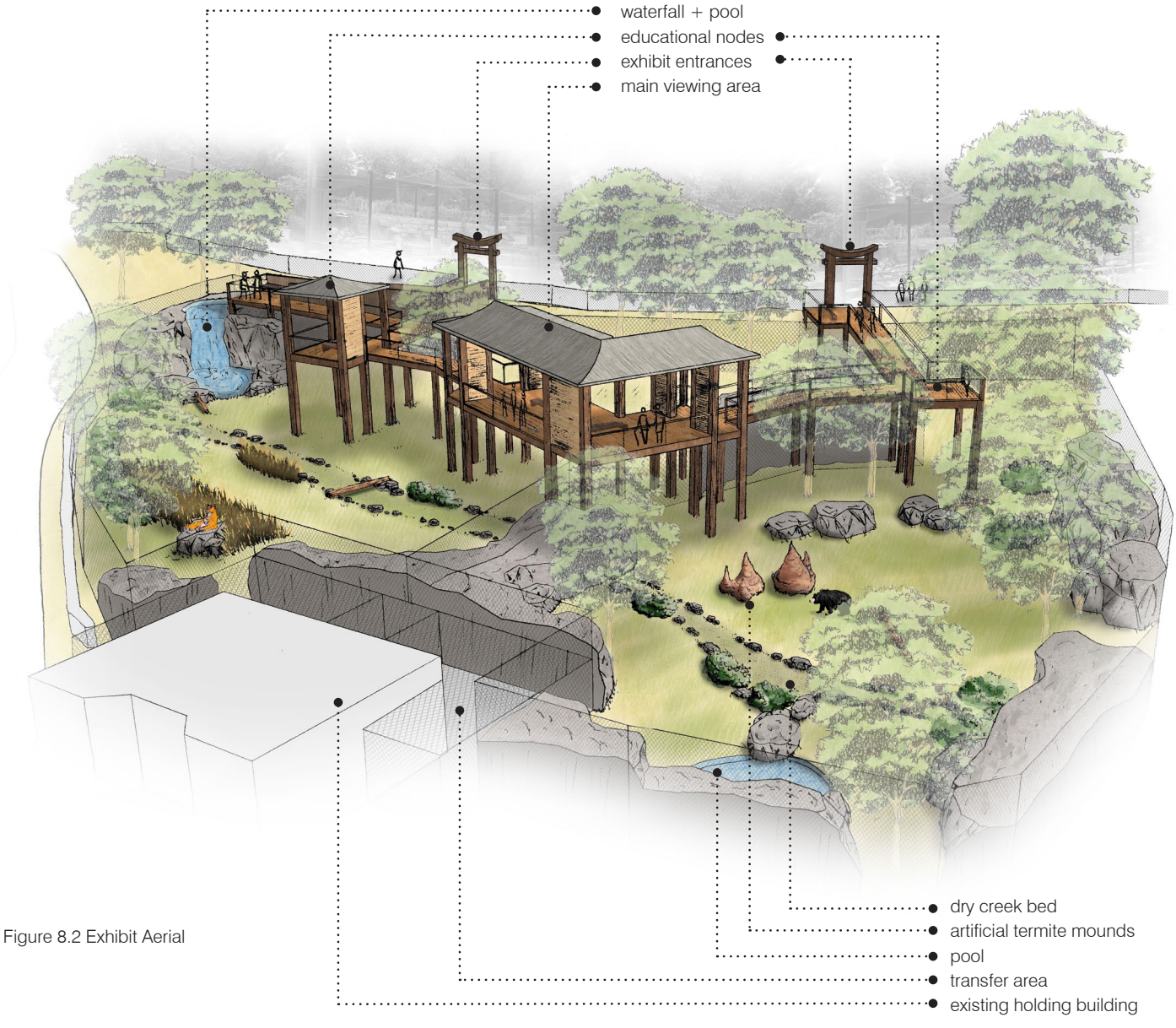


Figure 8.2 Exhibit Aerial

Exhibit Overview

Both species' exhibits are vegetated in ways that closely imitate their native habitats, but use plants that are native to Kansas. The naturalized habitats encourage positive behaviors from the tigers and sloth bears, and allow visitors to understand the importance of conservation of the tiger, sloth bear, and their habitats.

Because of the existing topography an elevated walkway with a variety of viewing areas was used to create a unique experience for visitors. The elevated walkway has two entrances located along the main circulation path within the Asia Trail that allows visitors to travel through the exhibits without needing to backtrack.

Figure 8.3 Exhibit Plan

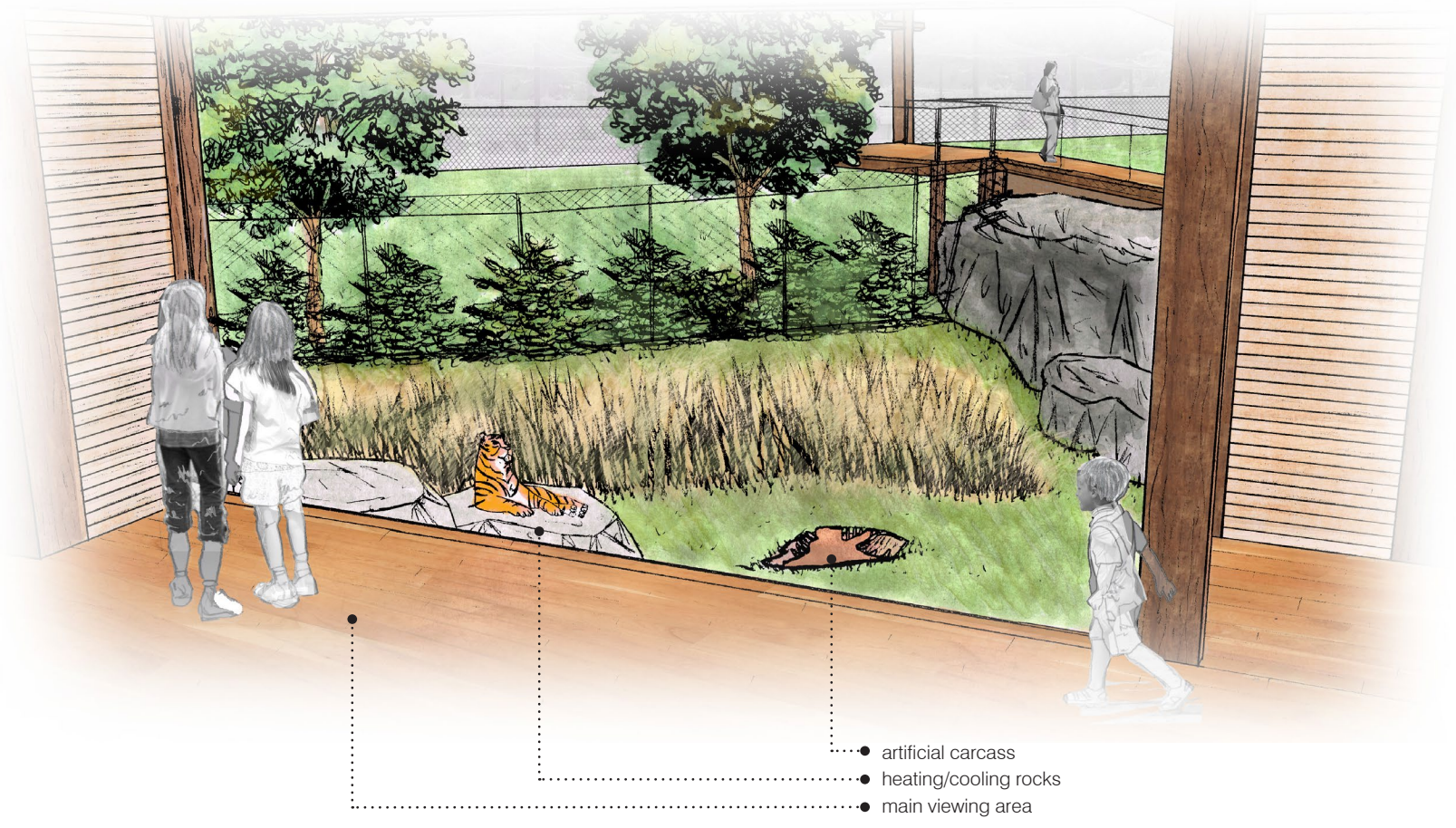


Figure 8.4 Artificial Carcass in Tiger Exhibit from Main Viewing Area

Animal Features

Enrichment features are located throughout the tiger and sloth bear exhibits. In the outdoor enclosures natural and artificial rock, and logs are provided for climbing and exploring. Strategically locating enrichment features draws animals to certain areas where visitors can view them from the elevated walkway and main viewing area. To further encourage natural behaviors from the sloth bears, treats and food can be placed within fallen logs and artificial termite mounds for the bears to forage. To demonstrate the tiger's natural feeding habits, an artificial carcass is placed within the exhibit that keepers can put meat in.

Rocks that are both heated and cooled in the exhibit offer comfort for the animals in the summer and winter months and attract the animals to certain areas where visitor views are directed. A waterfall within the tiger exhibit flows into a pool, giving the tiger access to drinking water and allowing them the chance to cool off in the summer months. A pool for water access is also located on the western edge of the sloth bear exhibit.

The existing off-exhibit holding area remains as an indoor area where the animals can be kept at night and during inclement weather.

Figure 8.5 Enrichment Feature Locations

Keeper Features

To get into their respective holding areas within the building, the animals must pass through a series of gates, focusing on security and safety. Automatic latches on doors and gates also make management of the animals safer and easier for keepers. The indoor areas and outdoor areas are connected, which make is easy for animals to be transferred between the different areas. Security cameras are placed throughout the outdoor exhibit to allow keepers to view the animals even when they are in hiding spots.

Visitor Features

Keepers or volunteers can be located in the main viewing area or along the walkways in designated educational areas. These keepers and volunteers can interact with visitors by telling them stories about the tiger and sloth bear, why enrichment activities are important for the animals, and why it is important to conserve their natural habitats.

Enrichment features and training sessions will be used to excite and educate the visitors about the tiger and sloth bears.

Figure 8.6 Educational Areas

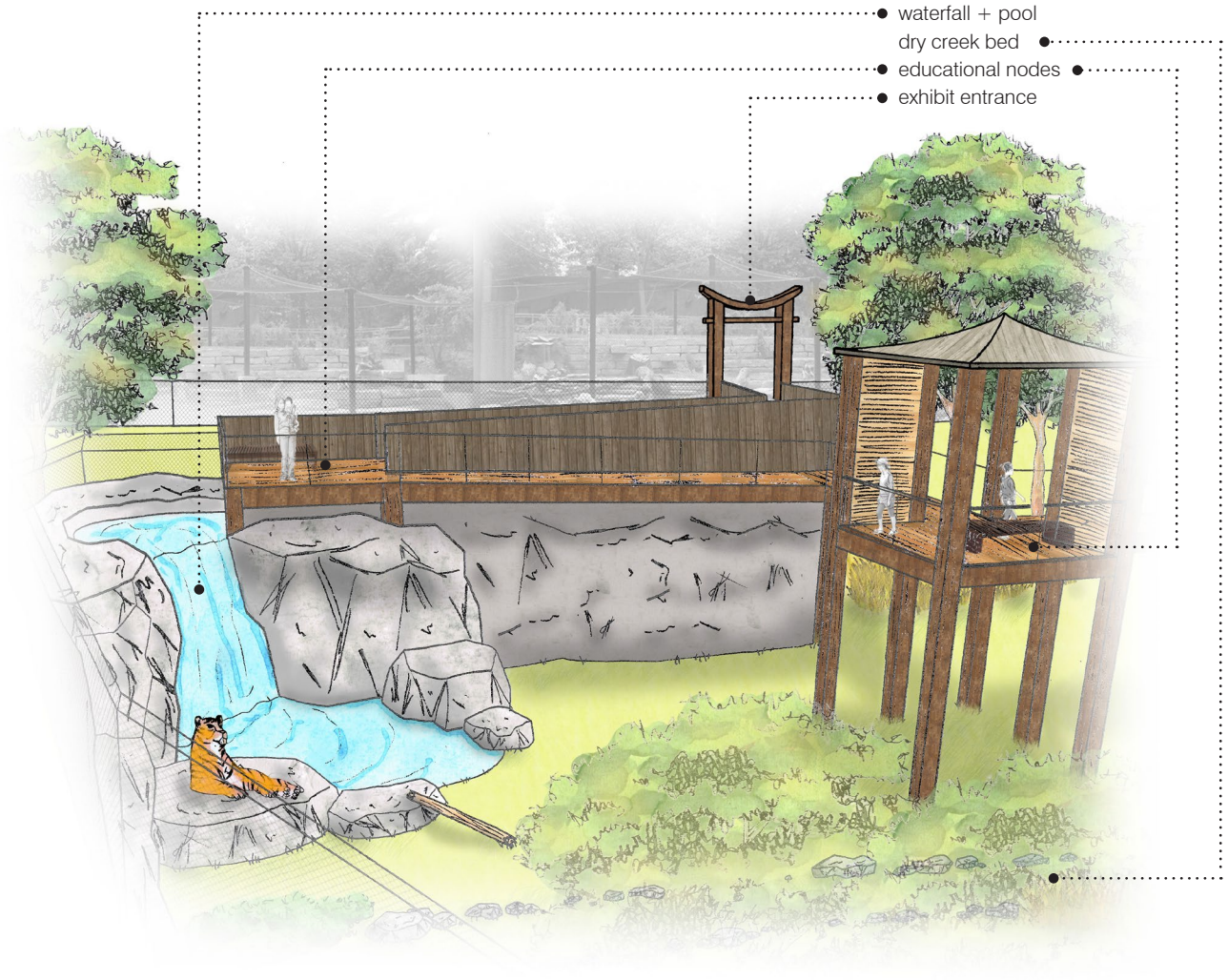


Figure 8.7 Elevated Walkway + Waterfall

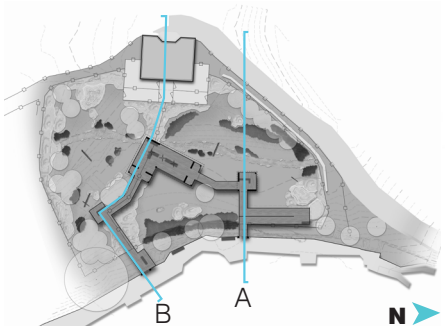
The elevated viewing area is intended to create an immersive experience for visitors. As visitors walk along the elevated walkway from the main path they are walking deeper into the exhibit and toward a destination. Glass panes in the viewing area reduce the amount of visual interference when visitors are looking from the main viewing area into the exhibits.

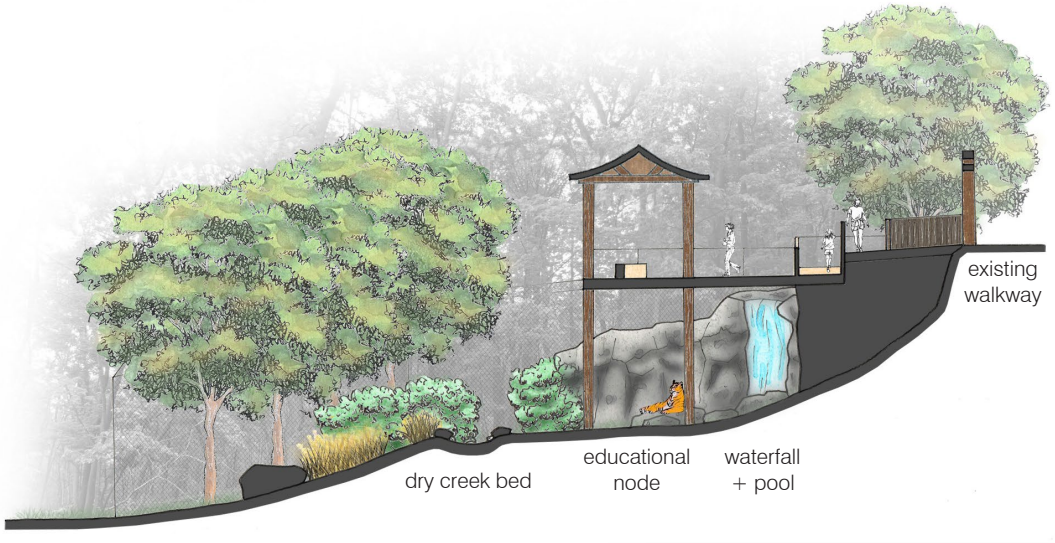
To meet the needs of the different types of visitors, a variety of spaces were created. Educational opportunities throughout the viewing areas allow people to learn about the species and their habitats. Including seating throughout the viewing areas also allows people to spend more time within the exhibits for viewing the animals or listening to a keeper chat.

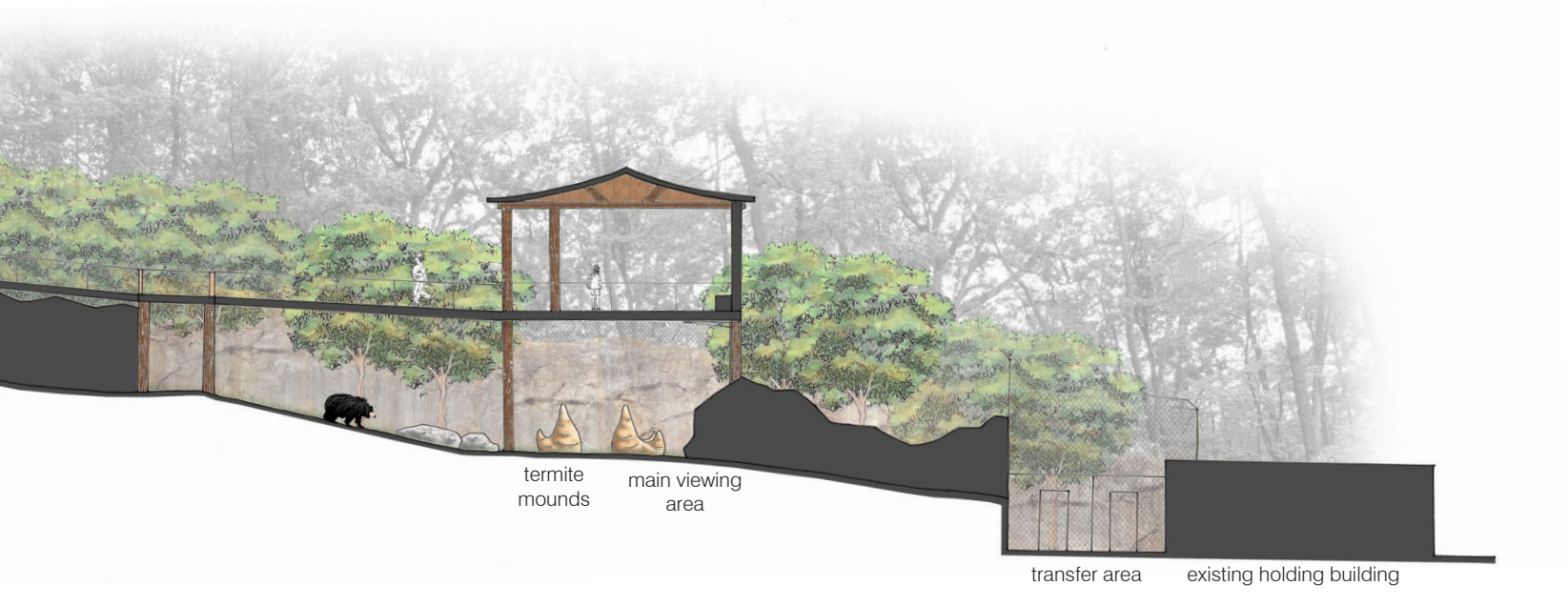
Safety Features

In addition to security cameras and automatic latches on transfer gates, the rock walls that are located on the edges of the exhibits have overhangs. These overhangs reduce footholds and the chances of them being climbed.

Figure 8.8 Rock Barrier Overhang







Top: Figure 8.9 Section A: Tiger Exhibit
Bottom: Figure 8.10 Section B: Sloth Bear Exhibit

Conservation Education

When educating people about the importance of conservation of animals and their habitats in zoos, it is important to create a connection between them and nature. This connection is achieved by creating a sense of place that allows people to be inspired by nature and understand the importance of preserving it for the future. To create a sense of place, native plants were used to create a connection between visitors and the region. These connections have the potential to change attitudes towards nature and help people imagine wildlife and humans existing in harmony with each other.

Different experiences will be had by the different types of visitors to the zoo. The five types of visitors include the explorer, the facilitator, the professional/hobbyist, the experience seeker, and the spiritual pilgrim.

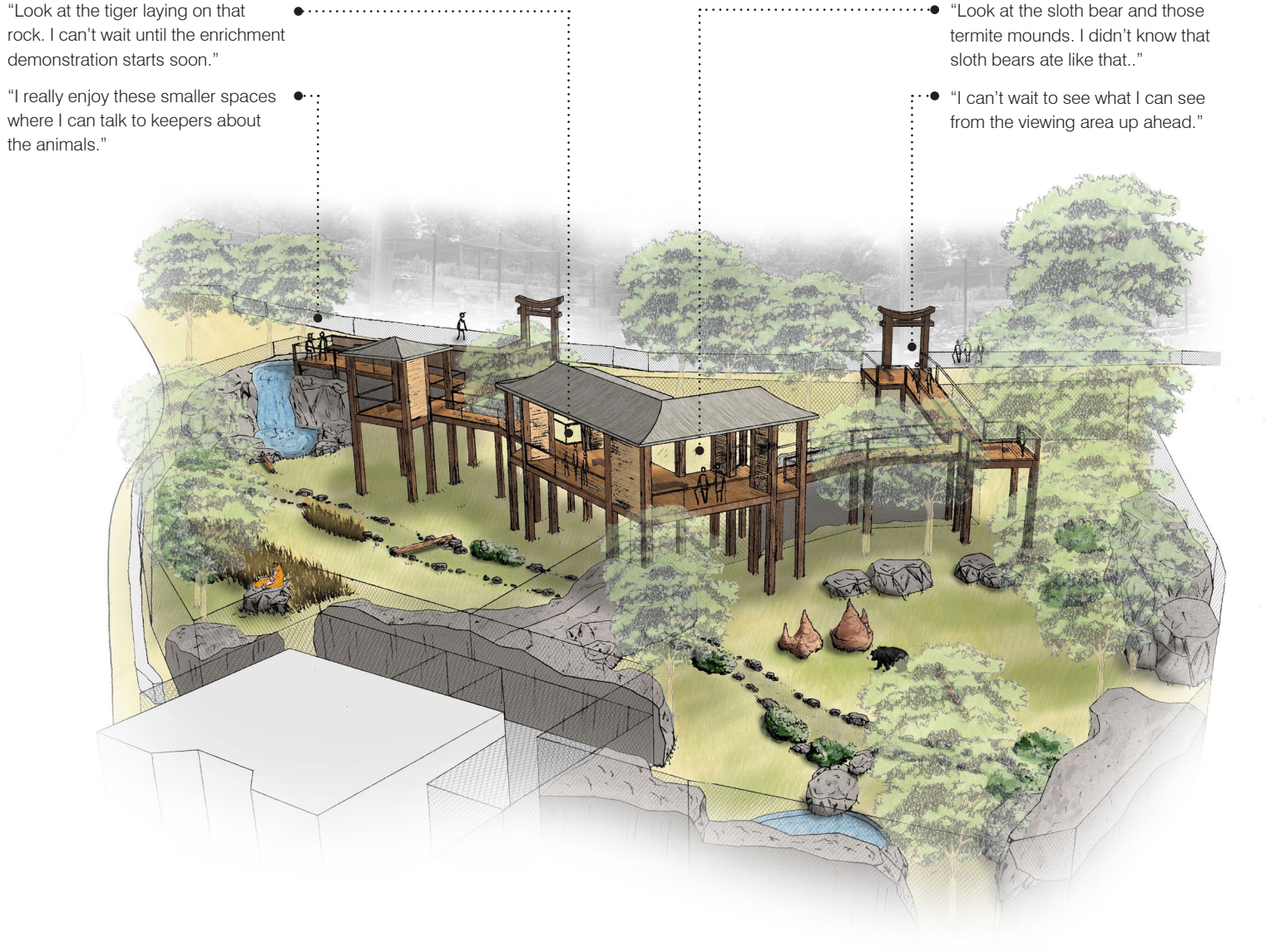


Figure 8.11 Exhibit Experience from the Explorer

09
conclusions

This project's most significant implication is its potential to influence stakeholder decisions about the redesign of the tiger and sloth bear habitats at Sunset Zoo. Historically, zoos have changed from places that offer little more than the sole purpose of displaying animals for entertainment to establishments and institutions that have goals of communicating important messages of conservation education to multitudes of people. In moving forward with the continued development of zoos and their exhibits it is important to keep in mind programs that focus on conservation and management of animals and how animals live in their natural environments. The main focus of all zoo-based conservation needs to be to show species while also conserving animals and their natural habitats. Even though most zoos now have a focus on conservation and education, there are still some exhibits that do not fully address the needs of the animals first.

My research and design project offers a way of looking at exhibit design that focuses on animal welfare and the most effective ways in educating visitors about conservation. Within the design, visitors are offered opportunities to interact with keepers or volunteers located within viewing areas in the exhibit. Through exploration, informative programs, and interactive education, there are chances to provide opportunities for all types of visitors to be inspired by and learn from nature. To inspire people and get them interested in wildlife and their habitats, it is important to encourage positive animal activities, which are influenced by successful exhibit design and integration of enrichment features. Once people are interested and have formed emotional and intellectual connections to the animals, then they are open to learning and understanding the animals and their habitats.

Because multiple methods were used to collect data, the information provided a strong basis for the design of the exhibits and viewing areas.

The direct observations showed that people are more interested in learning about the animals when they can interact with zoo keepers or volunteers, when the animals are active, and if there is available seating throughout the viewing areas. Signs were rarely read during my observation of 500 visitors.

The interview and precedent studies showed that it is vital to encourage natural behaviors from the animals. Within the design this was accomplished by including enrichment opportunities for the animals, including logs, artificial termite mounds, and an artificial carcass. It is also important to create an experience that visitors will remember. To create a unique experience, viewing areas were placed within the exhibit, and elevated walkways allow visitors to travel through the exhibits.

Limitations

One limitation for my project was conducting observational studies in the winter months, when zoos are not experiencing their peak number of visitors. Another limitation was working within the existing exhibit boundaries for the tiger and sloth bear exhibits.

The process of interviewing zoo staff was limited by availability and time constraints. Although multiple follow up emails and phone calls were made to attempt to set up interviews, zoo staff did not have the time for interviews.

Since extensive research was required before starting the design, time available for design of was limited.

Future Research

Future research opportunities could include conducting additional interviews with zoo staff, to gain a better understanding of current educational program.

Surveys of zoo visitors could also be conducted to gain information about how much visitors are remembering from their visits and what messages impact them the most.

Additional research that focuses on designing for specific age groups would be beneficial, because learning processes change with age.

Conclusions

The research methodology used in this project led to solutions for the redesign of the tiger and sloth bear exhibits in ways that focused on effective methods of encouraging education about conservation in addition to providing a naturalized and stimulating exhibit for the animals. Through a synthesis of literature, precedent studies, direct observations, and an interview, this design for the tiger and sloth bear exhibits reflects the components of a successful educational programming strategy, as well as the needs of the animals inhabiting the exhibits.

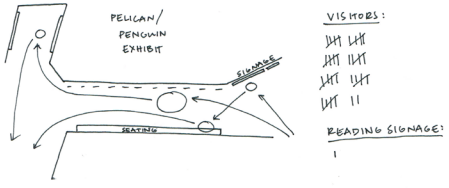
Based upon my research, key components of a successful educational programming strategy and design include:

1. Building a naturalized exhibit, focusing on animal welfare and an immersive experience for visitors.
2. Having keepers or volunteers available to talk directly to zoo visitors.
3. Offering enrichment features for animals that encourage activity and natural behaviors that visitors can observe.
4. Including interactive educational components for visitors.
5. Assuming that visitors will not use or read signage within exhibits.

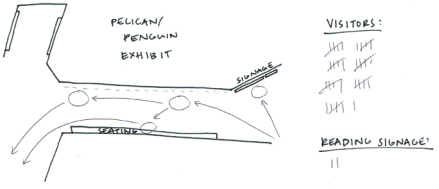
These key components were utilized in my final design for the exhibits and viewing areas. Including vegetation that resembles the species' natural habitats created a naturalized exhibit for the animals and visitors to experience. Smaller educational nodes in addition to a larger viewing area, allow keepers to be located throughout the exhibit to interact with visitors. Enrichment features that were placed throughout the exhibits include fallen logs, artificial termite mounds, an artificial carcass, rocks, and pools. Interactive educational components were also located within the main viewing area.

This project makes a case for the including more interactive educational programming into zoo exhibits to educate visitors. These programming elements can contribute to zoos and designers implementing successful strategies for education within zoo exhibits. The education of conservation of wildlife and their habitats is vital if the extinction of species is to be avoided.

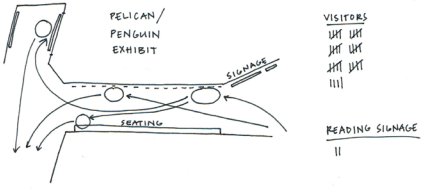
Appendix A: Observational Mapping



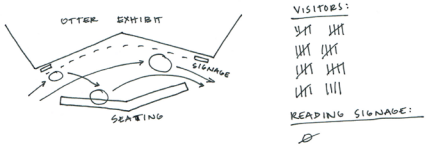
NOTES:
- Children running along glass
- Average 5 minutes or less except for when keeper was there - people wanted to hear information from an actual person



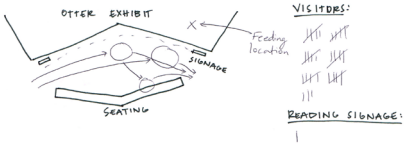
NOTES:
- Children running along glass with animals.
- A couple parents read signage for child
- Less than 5 minutes on average



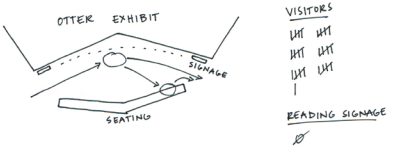
NOTES:
- Children running along side of glass with the penguins swimming.
- Less than 5 minutes spent at exhibit by visitors.



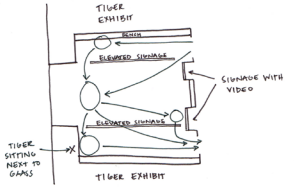
NOTES:
- Average 5 minutes or less
- Children running along glass
- No one read or looked at signage



NOTES:
- Feeding increased interest by visitors.
- Children running along glass
- Parents sitting + watching children.
- Average around 5 minutes at exhibit



NOTES:
- children running alongside otters swimming.
- Parents sitting on bench socializing and watching children
- ~~Keeper chat -> people want to talk to real people and are more interested in getting information from people.~~

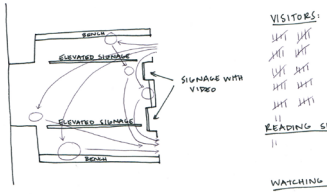


VISITORS: 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 III

READING SIGNAGE: II

WATCHING VIDEOS: 𝍸 I

NOTES:
- KEEPER CHAT INCREASED TIME VISITORS SPENT AT EXHIBIT.
- Average 10 minutes or less.
- Proximity of animals to viewing area increased visitor interest.
- Children and adults watched videos.
- Seating was used primarily by parents while children observed the animals.



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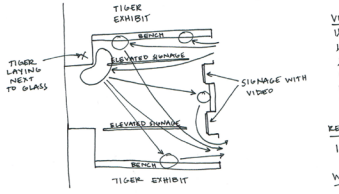
READING SIGNAGE: II

WATCHING VIDEOS: III

NOTES:
- Average 5 minutes or less
- A few people watched videos for around 1 minute
- Benches used for resting while snacking/eating lunch
- No tigers were close to the viewing area, so people moved on fairly quickly

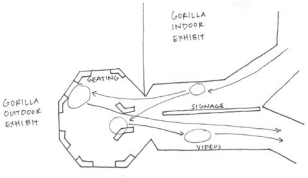


VISITORS: 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 II

READING SIGNAGE: II

WATCHING VIDEOS:

NOTES:
- INDOOR area with benches makes it popular for snacking/eating.
- Children more interested in signage graphics.
- Average 5 minutes, with a few groups staying up to 15 minutes.
- Close proximity of tiger to viewing area increased visitor interest.
- Videos were not playing during observations.

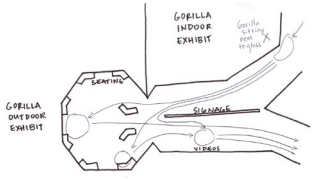


VISITORS: 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 III

READING SIGNAGE: II

WATCHING VIDEO: 𝍸 I

NOTES:
- Parents watched videos with children.
- Average less than 5 minutes at exhibit.
- People took advantage of seating for snack breaks/lunch.
- Visitors took a couple pictures, before leaving exhibit.

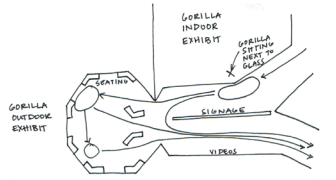


VISITORS: 𝍸 𝍸 𝍸 𝍸 IIII

READING SIGNAGE: I

WATCHING VIDEOS: III

NOTES:
- Parents sat while children watched videos and looked at the gorillas.
- Proximity of gorillas to viewing area
- Feeding increased visitor interest + time spent at the exhibit.
- Parents took advantage of seating while children watched videos or observed the animals.



VISITORS: 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 I

READING SIGNAGE: I

WATCHING VIDEO: III

NOTES:
- ONLY CHILDREN WATCHED VIDEOS.
- Close proximity of animals to glass made people more interested.
- Feeding time created interest.
- Average 5 minutes or less.

Appendix B: Interview Transcript

Interview with Scott Shoemaker, Director of Sunset Zoo
12 February 2015

MM: How do you think zoos contribute to people's understanding and perceptions of animals and their conservation?

SS: Just seeing the animals move and interact with the environment. Gain appreciation for them and want to get involved. Explain to visitors about animals. Graphics.

MM: How do you think zoos contribute to the ways people behave towards animals?

SS: Gain appreciation and understanding of beauty and grace of animals. Get people to see "uglier" animals – every species is important. Keep the exhibits as natural as possible to encourage natural behaviors.

Snowmen with meat in them for animals to find the food – hunting behavior.

Next step is to make people care about the animals. Example: cutting down rain forests – gibbons in danger – educate people about what they are consuming – palm oil. There are sustainable plantations that don't drive animals to extinction – be aware of where products are coming from. Read graphics.

MM: How can these impacts be increased? What is successful?

SS: Challenge selves to do more.

Save Animals From Extinction (S.A.F.E.) – 100 species that zoos can save from extinction – effort, but small. Call attention to public.

Jane Goodall says that every person can make a difference. Reach at least once person. That's our goal.

MM: What existing educational programs does your zoo offer?

SS: School outreach – bring collections to zoos (reptiles).

Birthday parties – opportunities to educate, birthdays have education themes, enrichment opportunities.

MM: Do the educational programs focus on certain age groups?

SS: Young children all the way up to high school.

MM: Do you think that these programs are successful?

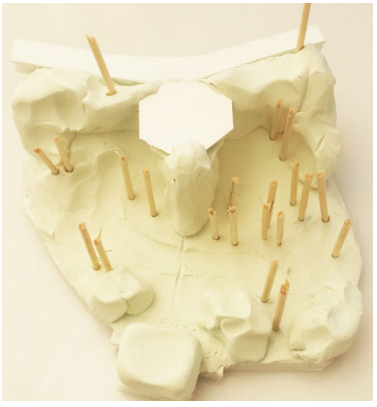
SS: Yes, I do.

MM: Do you think these programs could be improved upon? How?

SS: We're constantly trying to improve programs by surveying visitors.

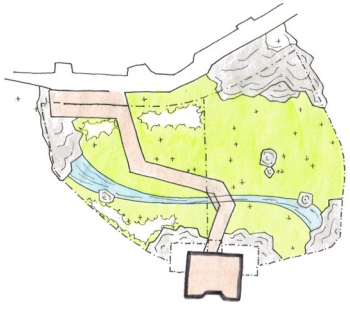
Appendix C: Design Process Explorations

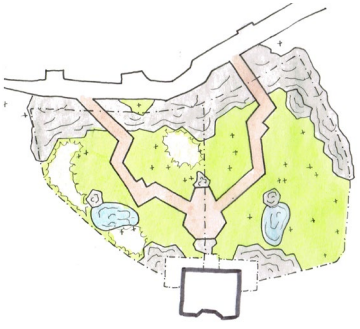
Study model locating main viewing area above existing holding building. Visitors would have to backtrack too much to get back to main walkway.

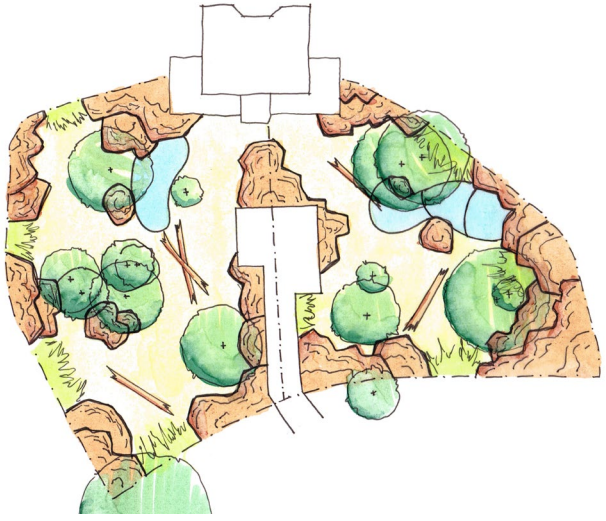


Study model with one viewing area that is located off of the main circulation path. Does not create a very immersive experience for visitors.

Study model that has main viewing area within the exhibits, creating a more immersive experience. Circulation through the exhibit also allows visitors to get back to the main walkway without needing to backtrack.







Preliminary site plan. Not enough of an immersive experience for visitors.

Site plan development. More immersive experience for visitors. Elevated walkway with educational nodes and main viewing area.

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Figure 4.2 Grenier, Josh. 2014. Omaha Zoo 7-25-2014-3. Digital Image. https://www.flickr.com/photos/jdg32373/14702653088/.

Figure 4.3 Offutt Air Force Base. 2009. 090418-F-7797P-005. Digital Image. https://www.flickr.com/photos/offutt_afb/6425776965/.

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Figure 4.5 Richards, Nick. 2006. Sloth Bear!. Photo. https://www.flickr.com/photos/nedrichards/193579965/.

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Figure 4.7 ShashiBellamkonda. 2008. Demo at Sloth Bear Habitat National Zoo Washington. Digital Image. https://www.flickr.com/photos/drbeachvacation/2522540109/.

Figure 4.8 ShashiBellamkonda. 2008. National Zoo, Washington DC Sloth Bear. Digital Image. https://www.flickr.com/photos/drbeachvacation/2521608470/.

Figure 4.9 Sipple, Sharon. 2014. SAS_7456. Digital Image. https://www.flickr.com/photos/ssipple/12045454386/.

Figure 4.10 Rasbach, Peter. 2002. Zoo Leipzig Sloth Bear Exhibit. Photograph.

Figure 4.11 Rasbach, Peter. 2002. Zoo Leipzig Sloth Bear Viewing Cave. Photograph.

Figure 4.12 Beatnik Photos. 2009. Tiger. Digital Image. https://www.flickr.com/photos/dharmabum1964/3770105131/.

Figure 4.13 Tiger Next to Viewing Area jmawork. 2008. 0944. Digital Image. https://www.flickr.com/photos/illuminated_photography/3021789540/.

Figure 4.14 Stearns, Geoff. 2011. Tiger. Digital Image. https://www.flickr.com/photos/tensafefrogs/5711491228/.

Figure 4.15 Bennett. 2008. IMG_4990. Digital Image. https://www.flickr.com/photos/bennett4senate/3016627234/.

Figure 4.16 Bertron, Ludovic. 2009. Go Meat!. Digital Image. https://www.flickr.com/photos/23912576@N05/3455801733/.

Figure 5.1 McElroy, Michelle. 2014. Observational Mapping Sample. Drawing.

Figure 7.1 McElroy, Michelle. 2014. Sunset Zoo Context Map. Adobe Illustrator.

Figure 7.2 McElroy, Michelle. 2014. Exhibit Location within Sunset Zoo. Adobe Illustrator.

Figure 7.3 McElroy, Michelle. 2014. Existing Features. Adobe Illustrator.

Figure 7.4 McElroy, Michelle. 2014. Existing Holding Building. Photograph.

Figure 7.5 McElroy, Michelle. 2014. Existing Retaining Wall + Road. Photograph.

Figure 7.6 McElroy, Michelle. 2014. Existing Topography. Adobe Illustrator.

Figure 7.7 McElroy, Michelle. 2014. Existing Drainage. Adobe Illustrator.

Figure 7.8 McElroy, Michelle. 2014. Existing Drain. Photograph.

Figure 7.9 McElroy, Michelle. 2014. Existing Vegetation. Adobe Illustrator.

Figure 7.10 McElroy, Michelle. 2014. Existing Trees within Exhibit. Photograph.

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